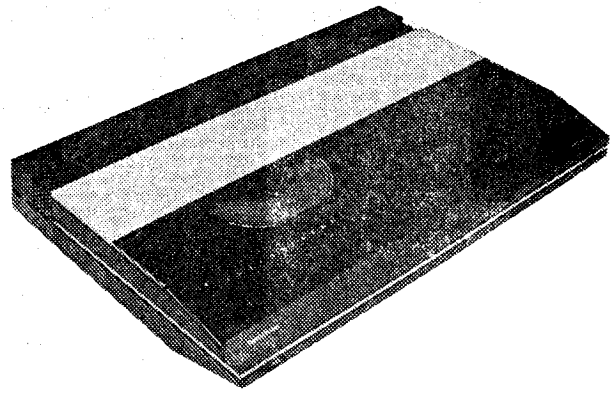
Bang&Olufsen



Beogram CDX

Type 5121/22/23/25

1056

For Service Manuals **Contact**
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

SERVICE MANUAL

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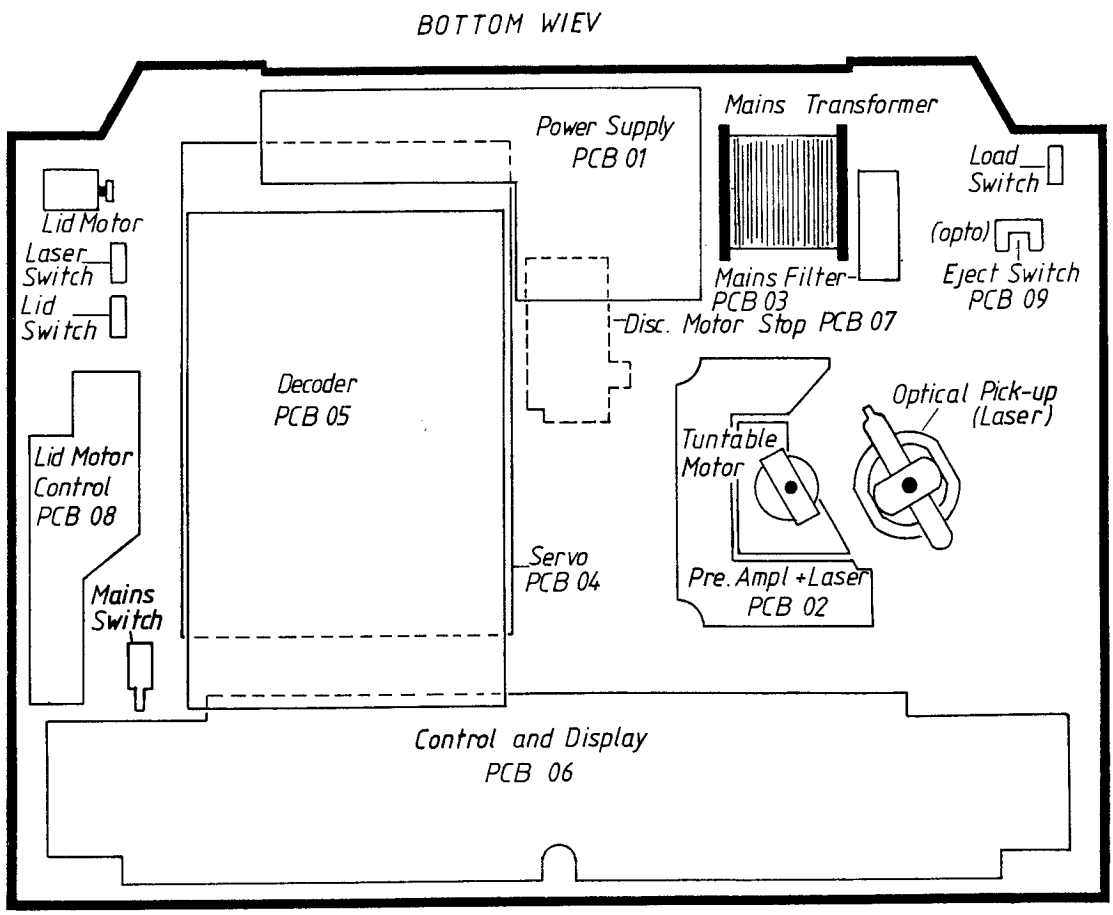
02 Pre. Ampl. & Laser ..... page 1-13
03 Mains Filter ..... page 1-4
04 Servo ..... page 1-5, 1-8
05 Decoder ..... page 1-9, 1-12
06 Control and Display ..... page 1-17
07 Motor Stop ..... page 1-15
08 Motor Control ..... page 1-16
09 Eject Switch ..... page 1-16



CAUTIONS

The light pin is much more sensitive to static charge than a MOS IC. Careless treatment during servicing may reduce life expectancy drastically. For this reason care should be taken that during servicing the potentials of the aids and yourself equal the potential of the mechanism.

The CD-mechanism is provided with self-lubricating bearings and should thus NOT be lubricated.

Attention:
To prevent adjustments in the mechanism from changing, no screws other than those mentioned should be loosened.

Ensure that the player is not resting on the shaft of the turntable motor or the light pin during repairs and measurements.

Symbol for Safety Components

When replacing components with this symbol components with identical part numbers are to be used. The new component must be fitted in the same way as the one replaced.

For order to make the product work when placed in service position, see page 7 dismantling.

DIAGRAM EXPLANATION

The respective diagrams are named, e.g. SERVO 1. The cable connections between the diagrams are described by the name of the diagram to which the connection goes, as well as by the socket and pin number (or a designation) on the diagram in question.

System of co-ordinates

The most closely written diagrams and PCB drawings are provided with a system of co-ordinates.

The position numbers with attached co-ordinate designation can be found at the top of the diagram pages and next to the PCB drawings.

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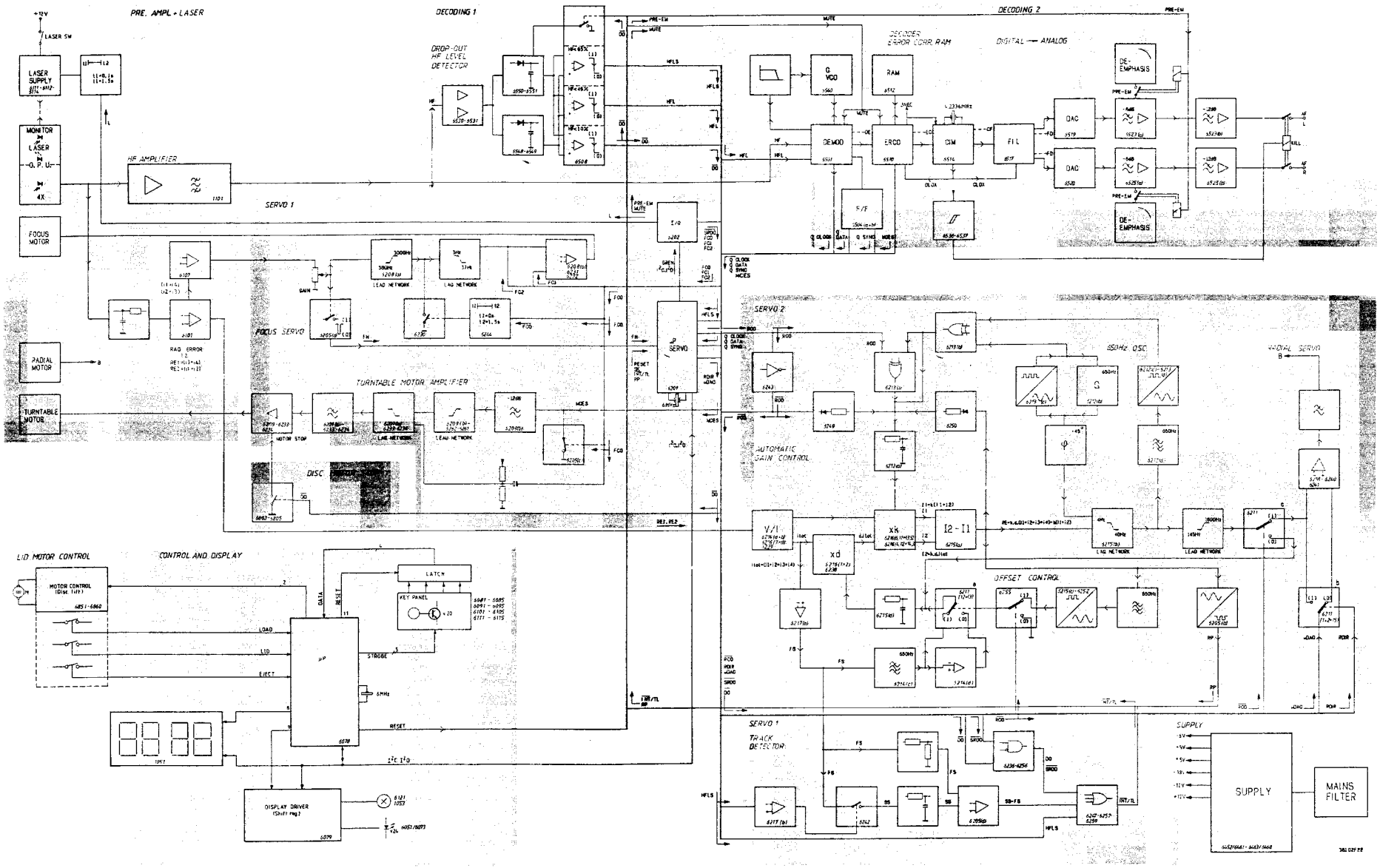
BLOCK DIAGRAM



POWER SUPPLY 8005168 - PCB1

Semi-conductors

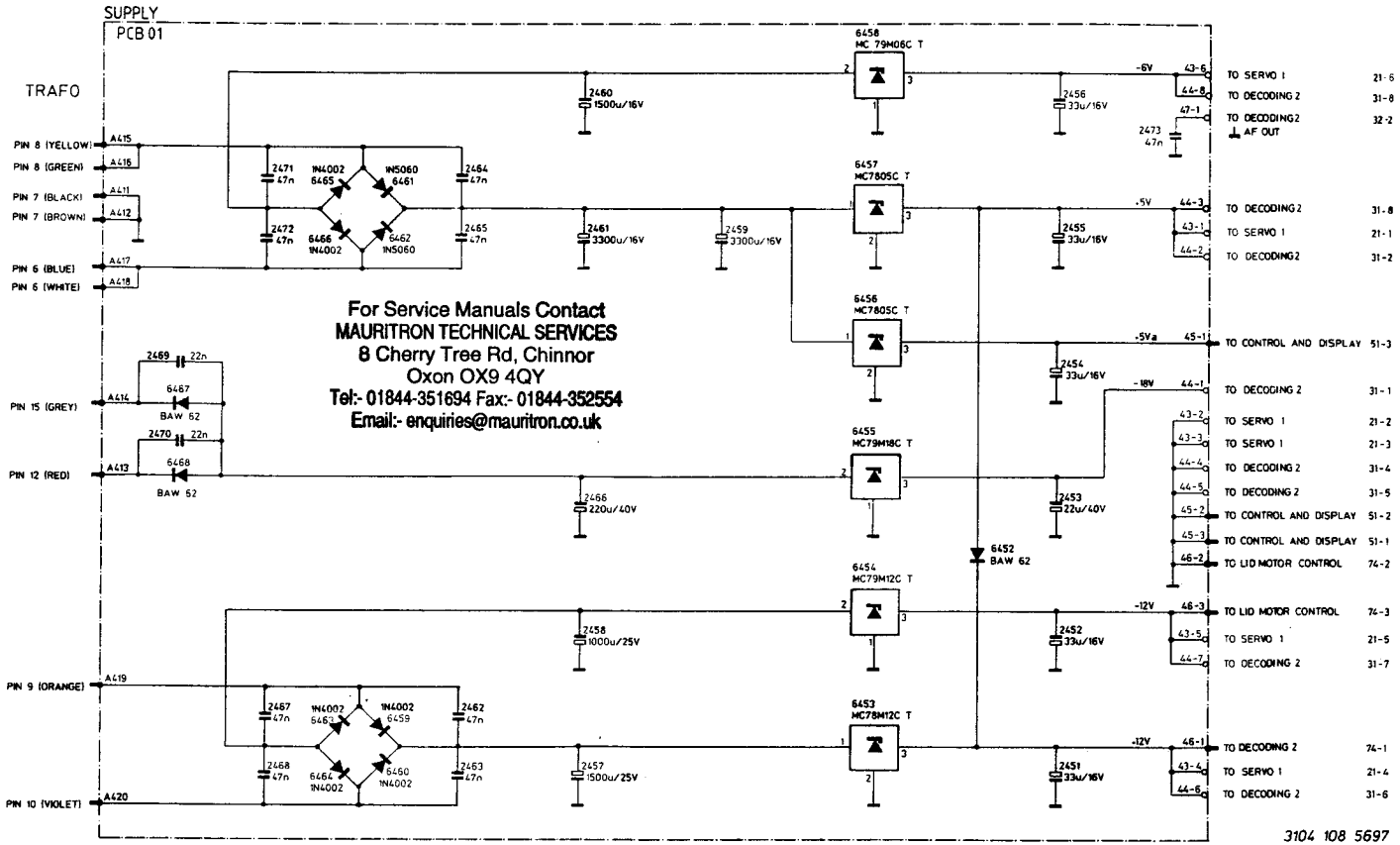
105	209		

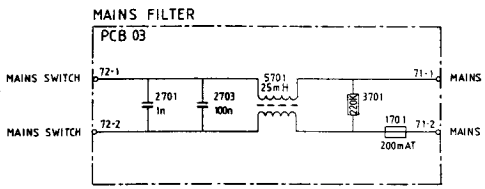
IC's

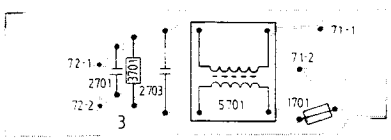
6453	8340049 **105**	MC78M12C
6454	8340356 **105**	MC79M12C
6455	8340814 **105**	MC79M18C
6456	8340065 **105**	MC7805C
6457		
6458	8340815 **105**	MC79M064

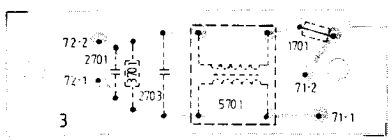
Diodes

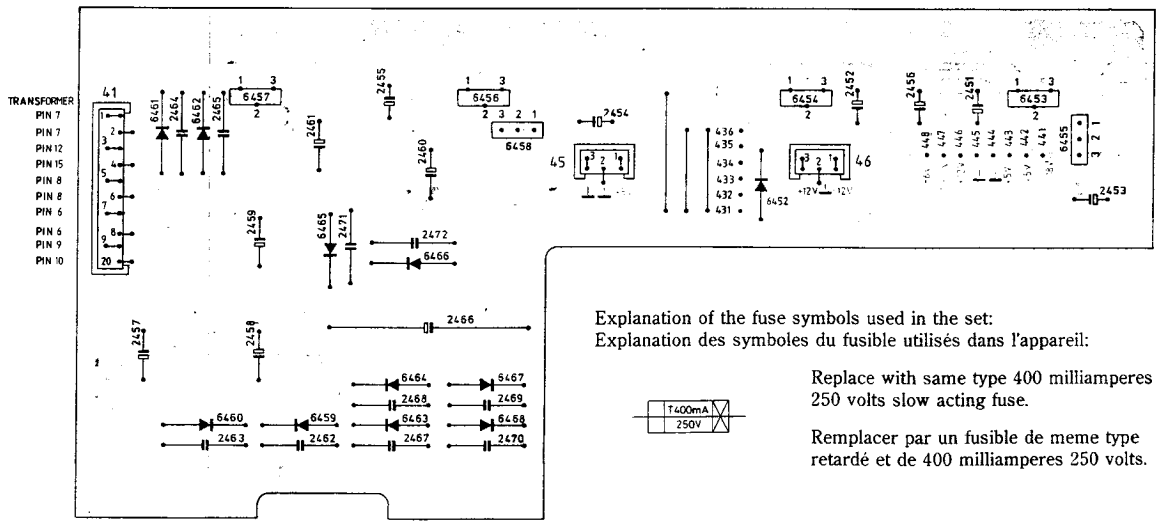
6452	8300359 **209**	BAW 62
6459-	8300023 **209**	1N4002
6460		
6461	8300436 **209**	1N5060
6462		
6463-	8300023 **209**	1N4002
6466		
6467	8300359 **209**	BAW 62
6468		









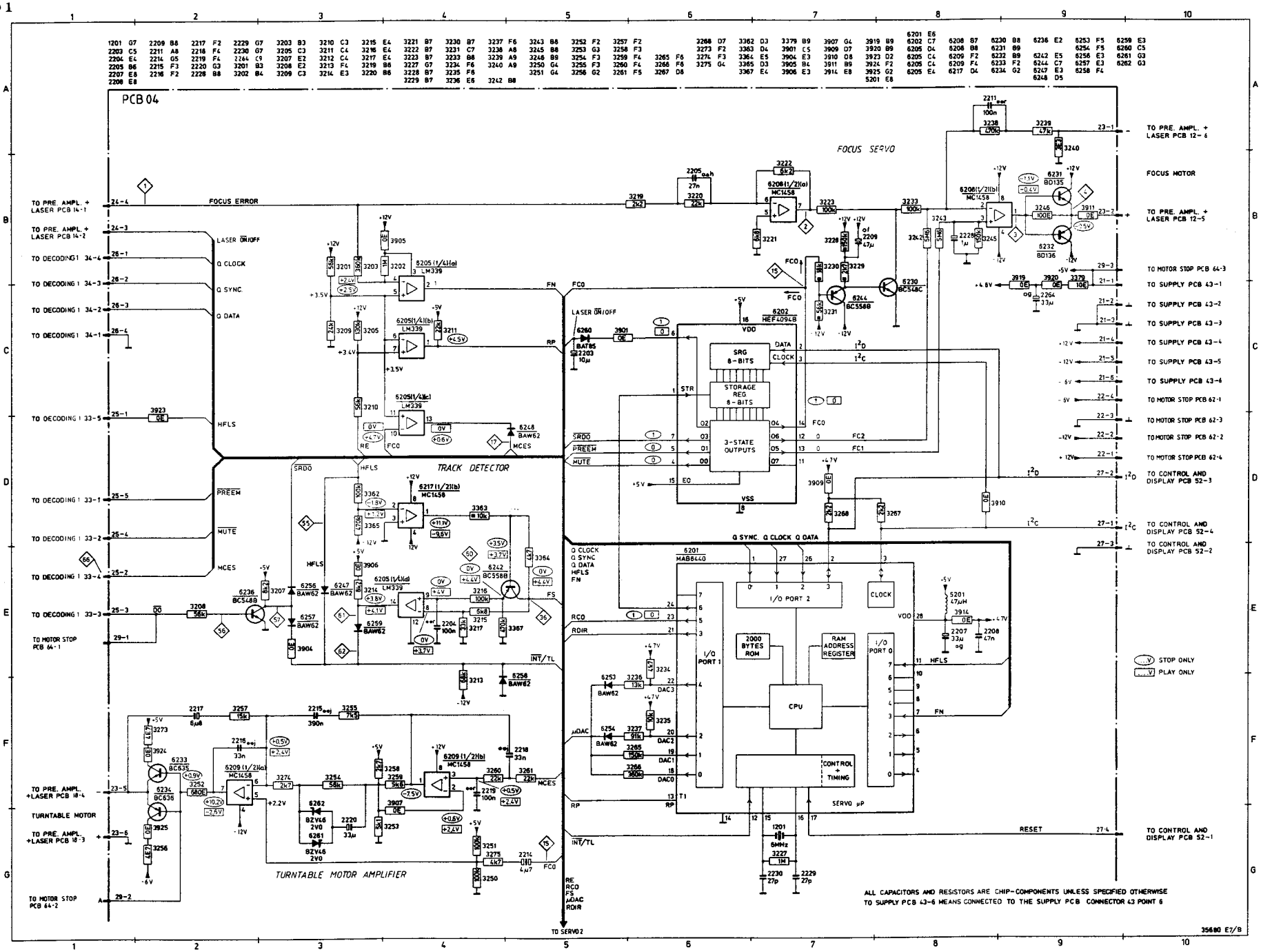


Explanation of the fuse symbols used in the set:
Explanation des symboles du fusible utilisés dans l'appareil:

Replace with same type 400 milliamperes 250 volts slow acting fuse.

Remplacer par un fusible de meme type retardé et de 400 milliamperes 250 volts.

SERVO 1


PCB 04
FOCUS SERVO
TRACK DETECTOR
TURNTABLE MOTOR AMPLIFIER
TO PRE. AMPL. + LASER PCB 14-1
TO PRE. AMPL. + LASER PCB 14-2
TO DECODING 1 34-4
TO DECODING 1 34-3
TO DECODING 1 34-2
TO DECODING 1 34-1
TO DECODING 1 33-5
TO DECODING 1 33-1
TO DECODING 1 33-2
TO DECODING 1 33-4
TO DECODING 1 33-3
TO MOTOR STOP PCB 64-1
TO PRE. AMPL. +LASER PCB 18-4
TURNTABLE MOTOR
TO PRE. AMPL. +LASER PCB 18-3
TO MOTOR STOP PCB 64-2
FOCUS ERROR
LASER ON/OFF
Q CLOCK
Q SYNC
Q DATA
HFLS
PREEM
MUTE
MCES
TO PRE. AMPL. + LASER PCB 12-6
FOCUS MOTOR
TO PRE. AMPL. + LASER PCB 12-5
TO MOTOR STOP PCB 64-3
TO SUPPLY PCB 63-1
TO SUPPLY PCB 63-2
TO SUPPLY PCB 63-3
TO SUPPLY PCB 63-4
TO SUPPLY PCB 63-5
TO SUPPLY PCB 63-6
TO MOTOR STOP PCB 62-1
TO MOTOR STOP PCB 62-3
TO MOTOR STOP PCB 62-2
TO MOTOR STOP PCB 62-4
TO CONTROL AND DISPLAY PCB 52-3
TO CONTROL AND DISPLAY PCB 52-4
TO CONTROL AND DISPLAY PCB 52-2
TO CONTROL AND DISPLAY PCB 52-1
STOP ONLY
PLAY ONLY
RESET
TO SERVO2
ALL CAPACITORS AND RESISTORS ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE
TO SUPPLY PCB 63-6 MEANS CONNECTED TO THE SUPPLY PCB CONNECTOR 63 POINT 6
35680 E7/8

SERVO 8005165 - PCB4

1201	C3	2208	B3	2216	H2	2228	E2	2237	I4	2246	G4	2257	H4	2265	G3	3203	B4	3210	B4	3215	B4
2203	D2	2209	E3	2217	I2	2229	B3	2238	I3	2247	H4	2259	G3	2266	G3	3205	B4	3211	B4	3216	C4
2204	B4	2211	E3	2218	H3	2230	C3	2239	I4	2250	I4	2261	D4	2267	G2	3207	D2	3212	B4	3217	C4
2205	D2	2214	H2	2219	H3	2233	I4	2243	G4	2251	G3	2262	C4	3201	B4	3208	D2	3213	B3	3218	D3
2207	B2	2215	H3	2220	E2	2236	I3	2244	H3	2256	H4	2264	E4	3202	B4	3209	B4	3214	B4	3220	E3
3221	E3	3229	E3	3235	C3	3240	E2	3250	I3	3255	H3	3260	H3	3268	B2	3279	I4	3284	G4	3291	H4
3222	F3	3230	E3	3236	C3	3242	E3	3251	I2	3256	I2	3261	H3	3273	I2	3280	I4	3285	B5	3292	H4
3223	F3	3232	B2	3237	C3	3243	E3	3252	H2	3257	I2	3265	C3	3274	H3	3281	G5	3286	D5	3293	E4
3227	C3	3233	F3	3238	E3	3245	F3	3253	I3	3258	I2	3266	C3	3275	H2	3282	H4	3287	E4	3294	E4
3228	E3	3234	C3	3239	E2	3246	E2	3254	I2	3259	I3	3267	I4	3276	I4	3283	H4	3288	E4	3298	E4
3299	D4	3305	D4	3312	G4	3320	E4	3327	I4	3341	C5	3350	H3	3357	G4	3363	B4	3372	H4	3380	G3
3300	D3	3306	D4	3313	F4	3323	I4	3328	I4	3342	C5	3351	G4	3358	G4	3364	B4	3373	I4	3381	G3
3301	D4	3307	D4	3316	H3	3324	I3	3335	F4	3345	H4	3352	G4	3359	H4	3365	B5	3375	G4	3382	G3
3302	D4	3308	E4	3318	E3	3325	I3	3336	G4	3346	I4	3353	G3	3360	G4	3367	C4	3376	G3	3384	G3
3304	C4	3311	G4	3319	E3	3326	I4	3340	C5	3349	G3	3356	G3	3362	A4	3370	H4	3379	E5	3385	G2
3386	G2	3394	E4	3399	D4	3907	I3	3913	H4	3918	E3	3924	I2	6201	B3	6211	F4	6216	E4	6232	E2
3387	G2	3395	D4	3901	D2	3909	B2	3914	C2	3919	E4	3925	H2	6202	C2	6212	I4	6217	B5	6233	H2
3391	C4	3396	E4	3904	B4	3910	B2	3915	D5	3920	E4	5201	B2	6205	B4	6213	H4	6218	G3	6234	H2
3392	D4	3397	F3	3905	C4	3911	E2	3916	D3	3921	G2	5202	H2	6206	F3	6214	D4	6230	F3	6236	D2
3393	D4	3398	D3	3906	B4	3912	H4	3917	G4	3923	B3	5203	H2	6209	H3	6215	G4	6231	F2	6238	E3
6239	E3	6247	B3	6252	G4	6257	C3	6262	I3												
6240	G3	6248	F1	6253	C3	6258	B3														
6241	G3	6249	G4	6254	C3	6259	B4														
6242	C4	6250	G5	6255	F4	6260	D2														
6243	E5	6251	E4	6256	C2	6261	I2														

Semi-conductors

17	20	32	42	102	103	136	209	218

Transistors

6230	8320285 **20**	BC 548C	6239	8320108 **20**	BC 548B
6231*	8320239 **32**	BD 135	6240*	8320240 **32**	BD 136
6232*	8320240 **32**	BD 136	6241*	8320239 32	BD 135
6233	8320378 **17**	BD 635	6242	8320104 20	BC 558B
6234	8320632 **17**	BC 636	6243	8320108 **20**	BC 548B
6236	8320108 **20**	BC 548B	6244	8320104 **20**	BC 558B
6238	8320089 **42**	BF 494			

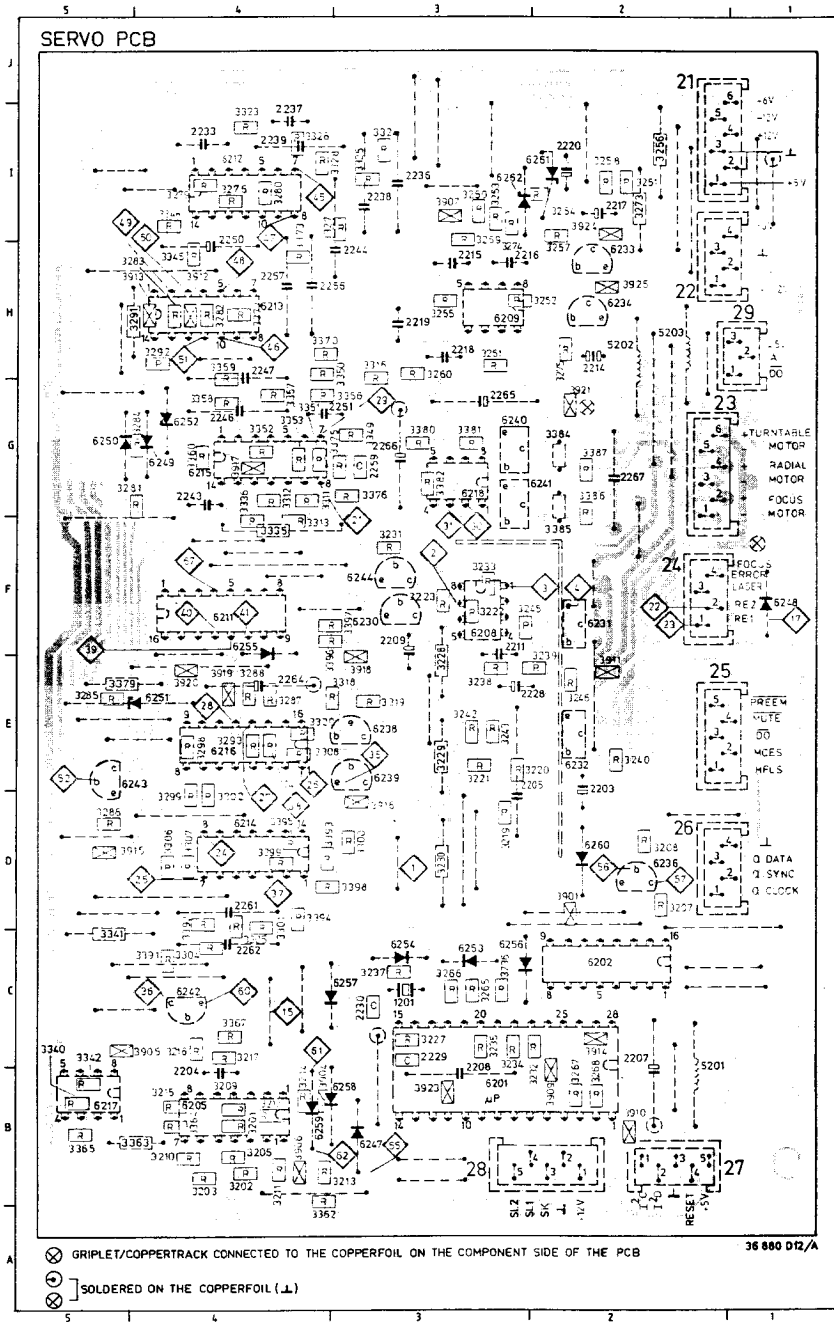
IC's

6201△	8340843 **136**	MAB 8440	6213	8340346 **136**	HEF 4070B
6202	8340782 **136**	HEF 4094B	6214	8340157 **102**	LM 324
6205	8340317 **102**	LM 339	6215		
6208	8340048 **103**	MC 1458	6216	8340301 **101**	TCA 240
6209			6217	8340048 **103**	MC 1458
6211△	8340340 **102**	HEF 4053	6218	8340141 **103**	µA 741
6212	8340157 **102**	LM324			

Diodes

6247-	8300359 **209**	BAW 62	6253-	8300359 **209**	BAW 62
6250	8300169 **209**	BZX79/C5V1	6259		
6251	8300438 **209**	BZX79/C2V4	6260	8300489 **218**	BAT 85
6252			6261	8300354 **209**	BZV46/2V0
			6262		

*Specially selected or adapted sample.



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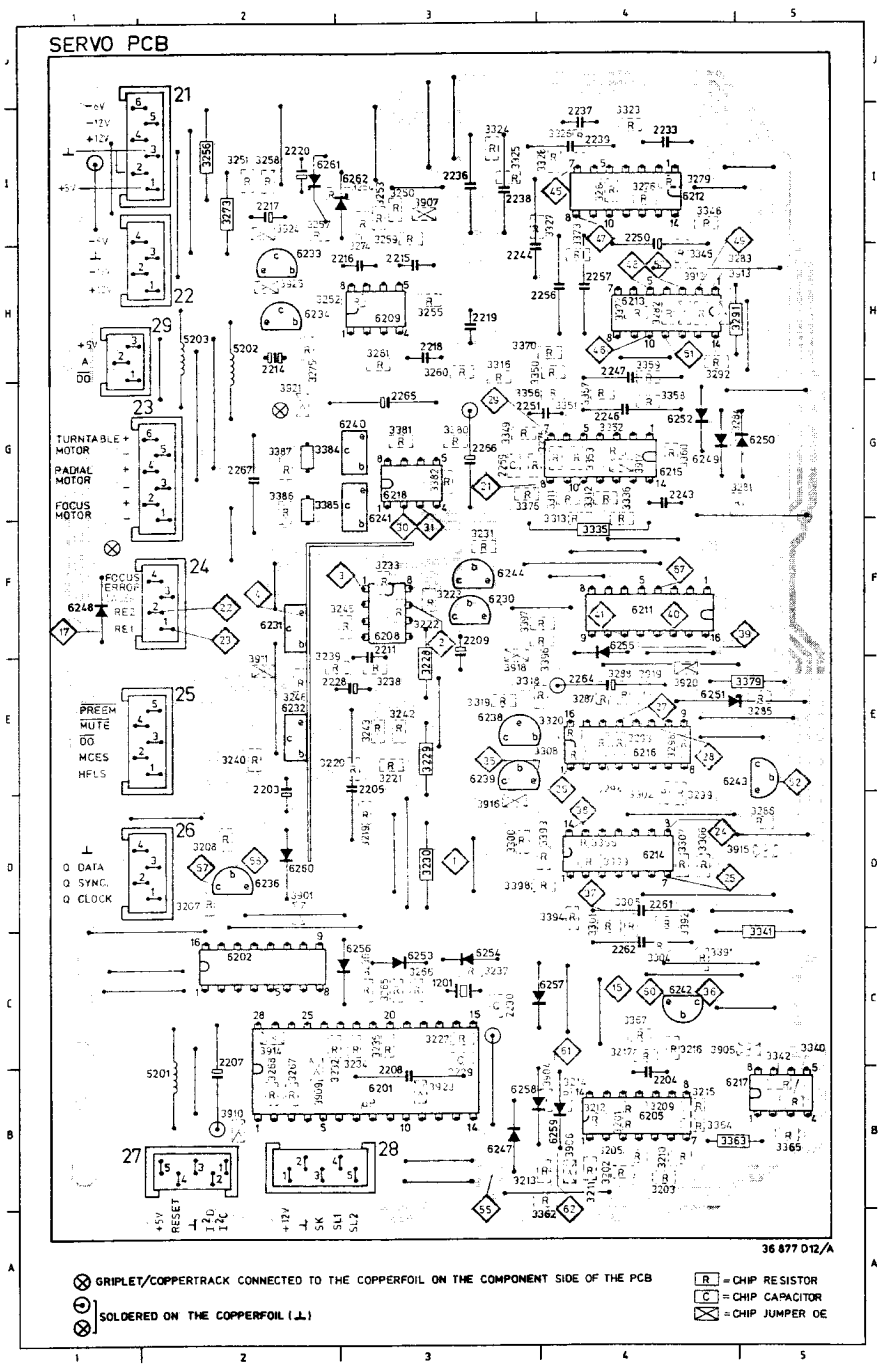
1-7

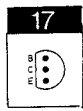
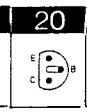
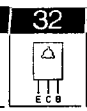
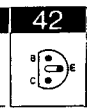
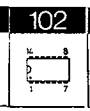
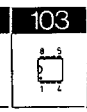
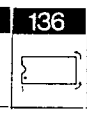
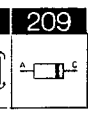
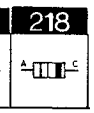
Bang&Olufsen



SERVO 8005165 - PCB4

1201	C3	2208	B3	2216	H2	2228	E2	2237	I4	**2246**	G4	2257	H4	2265	G3	3203	B4	3210	B4	3215	B4
2203	D2	2209	E3	2217	I2	2229	B3	2238	I3	**2247**	H4	2259	G3	2266	G3	3205	B4	3211	B4	3216	C4
2204	B4	2211	E3	2218	H3	2230	C3	2239	I4	**2250**	I4	2261	D4	2267	G2	3207	D2	3212	B4	3217	C4
2205	D2	2214	F2	2219	H3	2233	I4	2243	G4	**2251**	G3	2262	C4	3201	B4	3208	D2	3213	B3	3219	D3
2207	B2	2215	H3	2220	E2	2236	I3	2244	H3	**2256**	H4	2264	E4	3202	B4	3209	B4	3214	B4	3220	E3
3221	E3	3229	E3	3235	C3	3240	E2	3250	I3	**3255**	H3	3260	H3	3268	B2	3279	I4	**3284**	G4	3291	H4
3222	F3	3230	E3	3236	C3	3242	E3	3251	I2	**3256**	I2	3261	H3	3273	I2	3280	I4	**3285**	B5	3292	H4
3223	F3	3232	B2	3237	C3	3243	E3	3252	H2	**3257**	I2	3265	C3	3274	H3	3281	G5	**3286**	C5	3293	E4
3227	C3	3233	F3	**3238**	E3	3245	F3	3253	I3	**3258**	I2	3266	C3	3275	H2	3282	H4	3287	E4	3294	E4
3228	E3	3234	C3	**3239**	E2	3246	E2	3254	I2	**3259**	I3	3267	I4	3276	I4	3283	H4	3288	E4	3298	E4
3299	D4	3305	D4	**3312**	G4	3320	E4	3327	I4	3341	C5	3350	H3	3357	G4	3363	B4	3372	H4	3380	G3
3300	D3	3306	D4	**3313**	F4	3323	I4	3328	I4	3342	C5	3351	G4	3358	G4	3364	B4	3373	I4	3381	G3
3301	D4	3307	D4	**3316**	F3	3324	I3	3335	F4	3345	H4	3352	G4	3359	H4	3365	B5	3375	G4	3382	G3
3302	D4	3308	E4	**3318**	E3	3325	I3	3336	G4	3346	I4	3353	G3	3360	G4	3367	C4	3376	G3	3384	G3
3304	C4	3311	G4	**3319**	E3	3326	I4	3340	C5	3349	G3	3356	G3	3362	A4	3370	H4	3379	E5	3385	G2
3386	G2	3394	E4	3399	D4	3907	I3	3913	H4	3918	E3	3924	I2	6201	B3	6211	F4	6216	E4	6232	E2
3387	G2	3395	D4	3901	D2	3909	B2	3914	C2	3919	E4	3925	H2	6202	C2	6212	I4	6217	B5	6233	H2
3391	C4	3396	E4	3904	B4	3910	B2	3915	D5	3920	E4	5201	B2	6205	B4	6213	H4	6218	G3	6234	H2
3392	D4	3397	F3	3905	B4	3911	E2	3916	D3	3921	G2	5202	H2	**6208**	F3	**6214**	D4	6230	F3	**6236**	**D2**
3393	D4	3398	D3	3906	B4	3912	H4	3917	G4	3923	B3	5203	H2	**6209**	H3	**6215**	G4	6231	F2	**6238**	**E3**
6239	E3	6247	B3	6252	G4	6257	C3	6262	I3												
6240	G3	6248	F1	6253	C3	6258	B3														
6241	G3	6249	G4	6254	C3	6259	B4														
6242	C4	6250	G5	6255	F4	6260	D2														
6243	E5	6251	E4	6256	C2	6261	I2														

Semi-conductors

17	20	32	42	102	103	136	209	218
								

Transistors

6230	8320285	**20**	BC 548C	6239	8320108	**20**	BC 548B
6231*	8320239	**32**	BD 135	6240*	8320240	**32**	BD 136
6232*	8320240	**32**	BD 136	6241*	8320239	**32**	BD 135
6233	8320378	**17**	BD 635	6242	8320104	**20**	BC 558B
6234	8320632	**17**	BC 636	6243	8320108	**20**	BC 548B
6236	8320108	**20**	BC 548B	6244	8320104	**20**	BC 558B
6238	8320089	**42**	BF 494				

IC's

6201△	8340606	**136**	MAB 8440	6213	8340346	**136**	HEF 4070B
6202	8340782	**136**	HEF 4094B	6214	8340157	**102**	LM 324
				6215			
6205	8340317	**102**	LM 339				
				6216	8340301	**101**	TCA 240
6208	8340048	**103**	MC 1458				
6209				6217	8340048	**103**	MC 1458
6211△	8340340	**102**	HEF 4053	6218	8340141	**103**	µA 741
6212	8340157	**102**	LM324				

Diodes

6247-	8300359	**209**	BAW 62	6253-	8300359	**209**	BAW 62
				6259			
6250	8300169	**209**	BZX79/C5V1				
				6260	8300489	**218**	BAT 85
6251	8300438	**209**	BZX79/C2V4				
6252				6261	8300354	**209**	BZV46/2V0
				6262			

*Specially selected or adapted sample.

For Service Manuals Contact
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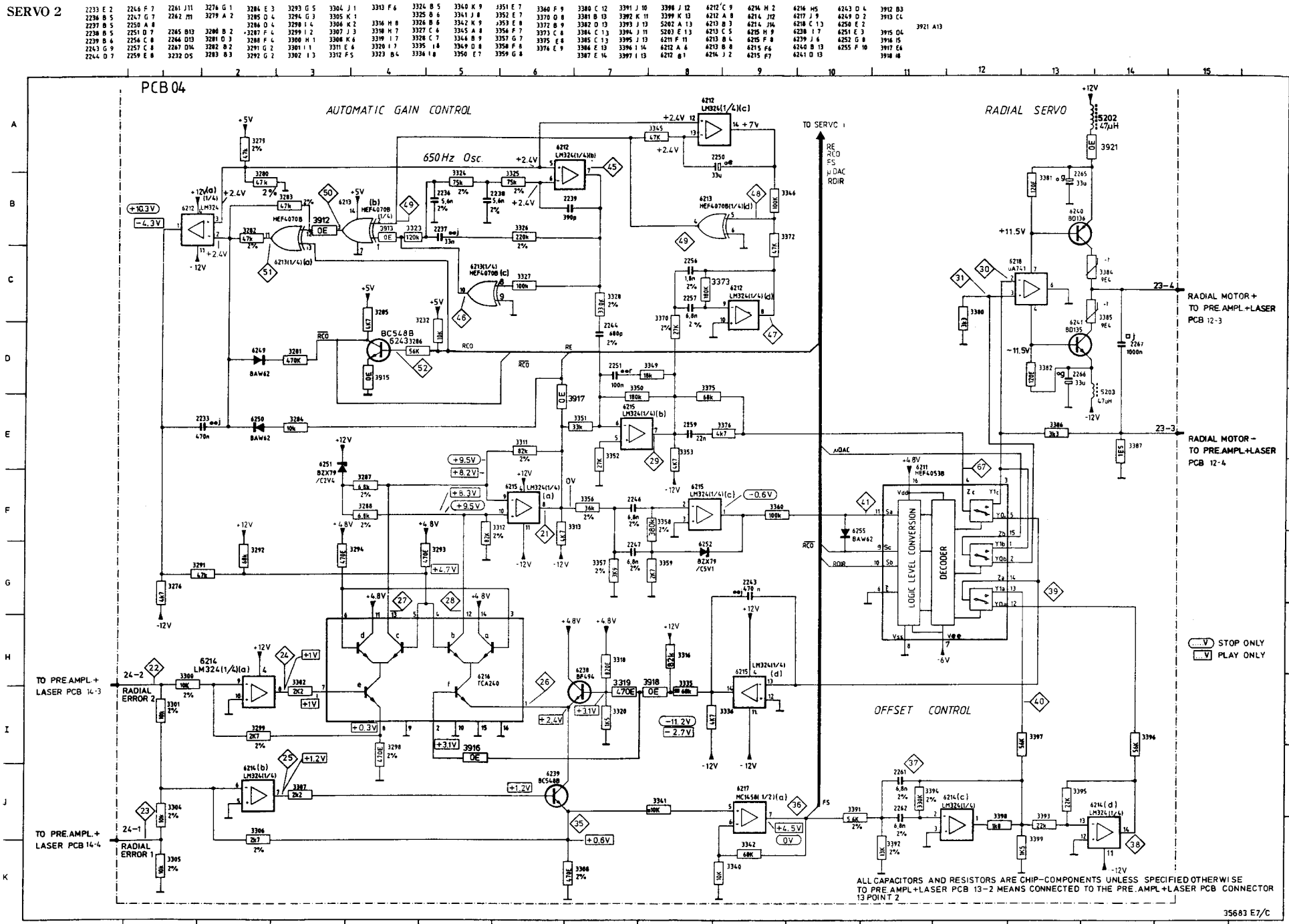
Email:- enquiries@mauritron.co.uk

SERVO 2


PCB 04
AUTOMATIC GAIN CONTROL
650Hz Osc.
RADIAL SERVO
OFFSET CONTROL
LOGIC LEVEL CONVERSION
DECODER
TO SERVO
RE
RCO
FS
µDAC
RDIR
RADIAL MOTOR + TO PRE.AMPL+LASER PCB 12-3
RADIAL MOTOR - TO PRE.AMPL+LASER PCB 12-4
TO PRE.AMPL.+ LASER PCB 14-3
TO PRE.AMPL.+ LASER PCB 14-4
RADIAL ERROR 2
RADIAL ERROR 1
STOP ONLY
PLAY ONLY
ALL CAPACITORS AND RESISTORS ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE
TO PRE.AMPL+LASER PCB 13-2 MEANS CONNECTED TO THE PRE.AMPL+LASER PCB CONNECTOR 13 POINT 2
35683 E7/C

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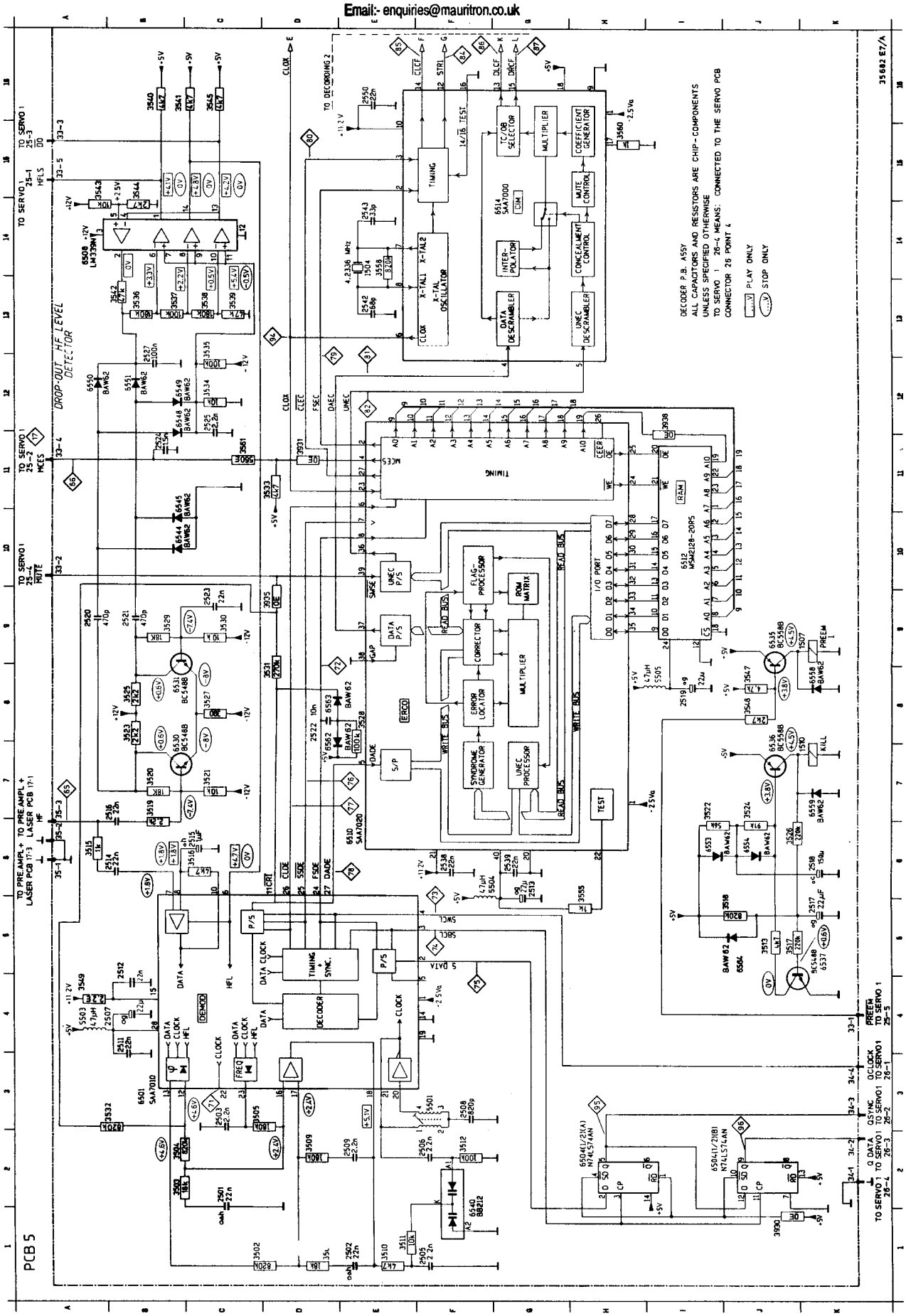
DECODING 1



DECODER 8005166 - PCB5

1504	C2	2503	A2	2508	B3	2514	B2	2519	C4	2524	C5	2542	C2	2559	E3	2567	E6	**2575**	F5
1507	D5	2504	D2	2509	B2	2515	A1	2520	A3	2525	A4	2543	D2	2560	E3	2568	E6	**2580**	E4
1510	F5	2505	B3	2511	B1	2516	A3	2521	A4	2527	A5	2550	D2	2562	E3	2570	E6	**2581**	E4
2501	B3	2506	B3	2512	A3	2517	D4	2522	B2	2538	C3	2555	E4	2564	E3	2571	E6	**2582**	E3
2502	B3	2507	B1	2513	C2	2518	D5	2523	A4	2539	C2	2558	E4	2566	D6	2573	E5	**2583**	E3
2584	E3	2589	E3	2597	E2	2605	E4	2618	E5	2625	F2	2632	E2	2637	E2	3503	A3	3510	B3
2585	E3	2591	E3	2599	E2	2606	E5	2619	E5	2627	E4	2633	E2	2638	E2	3504	A2	3511	B3
2586	E3	2593	E2	2601	D5	2608	E4	2620	D2	2628	F3	2634	E2	2639	E2	3505	A2	3512	B3
2587	E3	2594	E2	2602	E4	2610	F5	2623	D4	2630	E2	2635	E2	2641	E2	3507	A2	3513	D5
2588	E3	2595	E2	2603	E5	2617	E5	2624	E4	2631	E2	2636	E2	3502	A2	3509	B2	3515	A2
3516	A2	3521	B3	3526	D6	3531	B2	3536	B5	3541	A5	3547	D6	3558	C2	3566	D4	**3572**	E6
3517	D4	3522	D5	3527	B4	3532	B2	3537	B5	3542	B5	3548	D6	3560	D1	3567	D3	**3573**	D5
3518	D4	3523	B3	3528	B1	3533	C4	3538	B5	3543	A5	3549	A3	3561	C5	3569	E4	**3574**	E6
3519	A3	3524	D5	3529	A4	3534	A4	3539	B5	3544	A5	3550	D3	3564	D4	3570	E4	**3576**	E5
3520	A3	3525	B4	3530	B4	3535	B4	3540	A5	3545	A5	3555	C2	3565	D3	3571	E3	**3577**	E6
3579	F5	3584	E3	3593	E4	3598	E5	3605	E2	3931	C3	3941	E4	5505	C4	6512	C4	6523	E5
3580	F5	3585	E3	3594	D5	3599	E5	3606	E2	3935	C2	3944	D4	6501	B2	6514	D2	6525	E5
3581	F4	3590	D2	3595	E4	3600	F5	3607	D4	3936	D2	5501	B3	6504	B6	6517	D3	6530	A3
3582	E5	3591	E2	3596	E4	3601	F5	3608	D4	3937	E6	5503	B1	6508	A5	6519	D3	6531	A4
3583	E5	3592	E2	3597	E4	3602	F4	3930	A6	3938	C4	5504	C1	6510	C2	6520	D2	6535	D6
6536	D6	6548	A4	6554	C5	6563	B1												
6537	D5	6549	A4	6558	D5	6564	D5												
6540	B4	6550	A4	6559	F6														
6544	A4	6551	A4	6561	D4														
6545	A4	6553	C5	6562	B1														

Semi-conductors

20	102	103	136	209	214		

Transistors

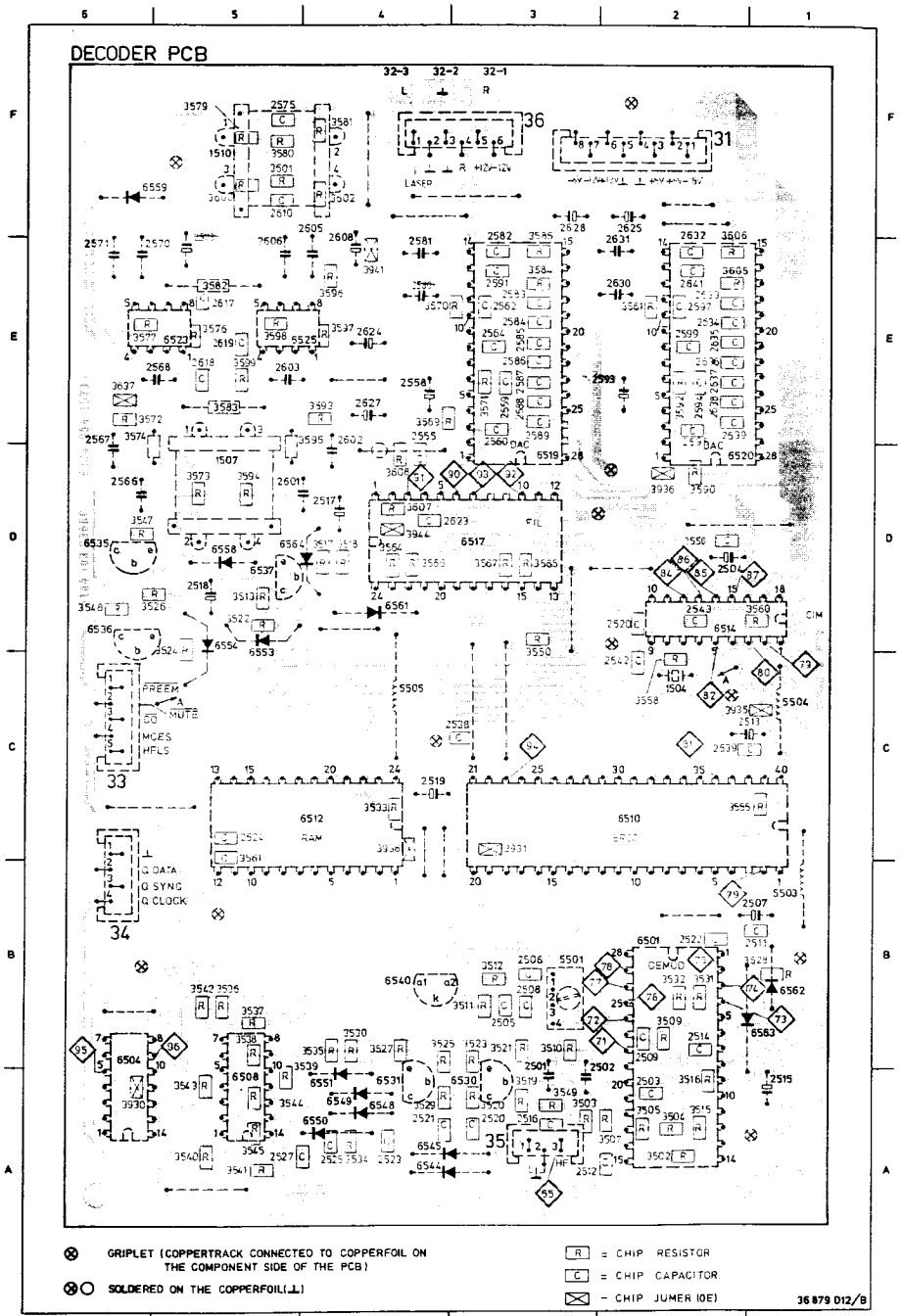
6530	8320108 **20**	BC 548B
6531		
6535	8230104 **20**	BC 558B
6536		
6537	8320108 **20**	BC 548B
6540		

IC's

6501Δ	8340807 **136**	SAA 7010
6504	8340366 **136**	N74LS74AN
6508	8340317 **102**	LM 339N
6510Δ	8340808 **136**	SAA 7020
6512Δ	8340809 **136**	MSM 2128-20RS
6514Δ	8340810 **136**	SAA 7000
6517Δ	8340811 **136**	SAA 7030
6519Δ	8340812 **136**	TDA 1540P
6520		
6523	8340250 **103**	NL 5532N
6525		

Diodes

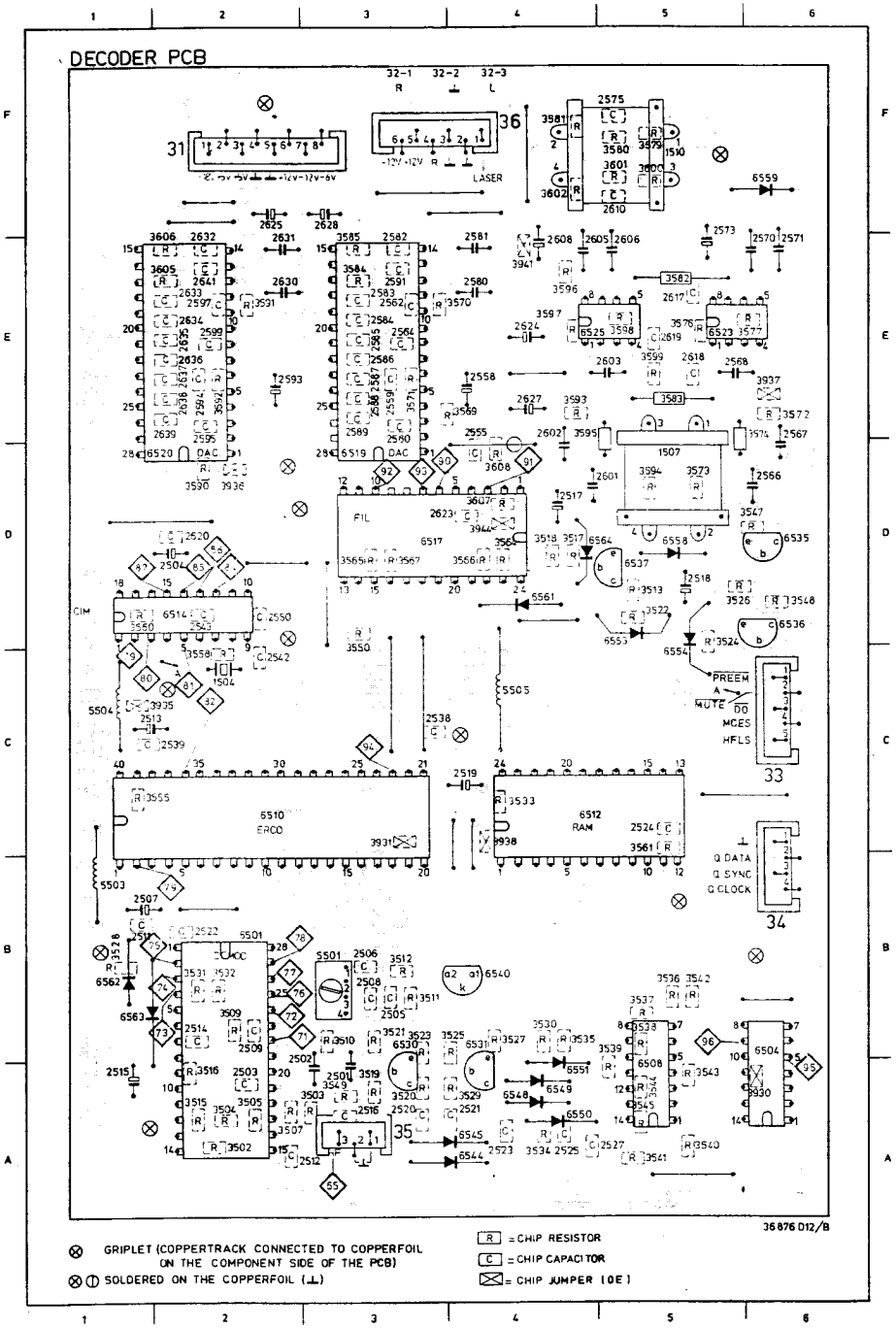
6544-6559	8300359 **209**	BAW 62
6561	8300245 **214**	BAX 18
6562-6564	8300359 **209**	BAW 62



1-11

1-11

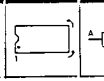
Bang&Olufsen



DECODER 8005166 - PCB5

1504	C2	2503	A2	2508	B3	2514	B2	2519	C4	2524	C5	2542	C2	2559	E3	2567	E6	2575	F5		
1507	D5	2504	D2	2509	B2	2515	A1	2520	A3	2525	A6	2543	D2	2560	E3	2568	E6	2580	E4		
1510	F5	2505	B3	2511	B1	2516	A3	2521	A6	2527	A5	2550	D2	2562	E3	2570	E6	2581	E4		
2501	B3	2506	B3	2512	A3	2517	D4	2522	B2	2538	C3	2555	E4	2564	E3	2571	E6	2582	E3		
2502	B3	2507	B1	2513	C2	2518	D5	2523	A4	2539	C2	2558	E4	2566	D6	2573	E5	2583	E3		
2584	E3	2589	E3	2597	E2	2605	E4	2618	E5	2625	F2	2632	E2	2637	E2	3503	A3	3510	B3		
2585	E3	2591	E3	2599	E2	2606	E5	2619	E5	2627	E4	2633	E2	2638	E2	3504	A2	3511	B3		
2586	E3	2593	E2	2601	D5	2608	F4	2620	D2	2628	F3	2634	E2	2639	E2	3505	A2	3512	B3		
2587	E3	2594	E2	2602	E4	2610	F5	2623	D4	2630	E2	2635	E2	2641	E2	3507	A2	3513	D5		
2588	E3	2595	E2	2603	E5	2617	E5	2624	E4	2631	E2	2636	E2	3502	A2	3509	B2	3515	A2		
3516	A2	3521	B3	3526	D6	3531	B2	3536	B5	3541	A5	3547	D6	3558	C2	3566	D4	3572	B6		
3517	D4	3522	D5	3527	B4	3532	B2	3537	B5	3542	B5	3548	D6	3560	D1	3567	D3	3573	D5		
3518	D4	3523	B3	3528	B1	3533	C4	3538	B5	3543	A5	3549	A3	3561	C5	3569	E4	3574	E6		
3519	A3	3524	D5	3529	A4	3534	A4	3539	B5	3544	A5	3550	D3	3564	D4	3570	E4	3576	E5		
3520	A3	3525	B4	3530	B4	3535	B4	3540	A5	3545	A5	3555	C2	3565	D3	3571	E3	3577	E6		
3579	F5	3584	E3	3593	E4	3598	E5	3605	E2	3931	C3	3941	E4	5505	C4	6512	C4	6523	E5		
3580	F5	3585	E3	3594	D5	3599	E5	3606	E2	3935	C2	3944	D4	6501	B2	6514	D2	6525	E5		
3581	F4	3590	D2	3595	E4	3600	F5	3607	D4	3936	D2	5501	B3	6504	B6	6517	D3	6530	A3		
3582	E5	3591	E2	3596	E4	3601	F5	3608	D4	3937	E6	5503	B1	6508	A5	6519	D3	6531	A4		
3583	E5	3592	E2	3597	E4	3602	F4	3930	A6	3938	C4	5504	C1	6510	C2	6520	D2	6535	D6		
6536	D6	6548	A4	6554	C5	6563	B1														
6537	D5	6549	A4	6558	D5	6564	D5														
6540	B4	6550	A4	6559	F6																
6544	A4	6551	A4	6561	D4																
6545	A4	6553	C5	6562	B1																

Semi-conductors

20	102	103	136	209	214		
							

Transistors

6530	8320108 **20**	BC 548B	6537	8320108 **20**	BC 548B
6531			6540		
6535	8230104 **20**	BC 558B			
6536					

IC's

6501△	8340807 **136**	SAA 7010	6514△	8340810 **136**	SAA 7000
6504	8340366 **136**	N74LS74AN	6517△	8340811 **136**	SAA 7030
6508	8340317 **102**	LM 339N	6519△	8340812 **136**	TDA 1540P
			6520		
6510△	8340808 **136**	SAA 7020			
			6523	8340250 **103**	NL 5532N
6512△	8340809 **136**	MSM	6525		
		2128-20RS			

Diodes

6544-6559	8300359 **209**	BAW 62	6562-**6564**	8300359 **209**	BAW 62
6561	**8300245 214**	BAX 18			

For Service Manuals Contact
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Oxon OX9 4QY
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DECODING 2

2504 E15 2555 C4 2558 B6 2559 A7 2560 B7 2562 A8 2564 B10 2566 A11 2567 A11 2568 A11 2570 B12 2571 C12 2573 C14 2575 C16 2580 E6 2581 E7 2582 E7 2583 E7 2584 E8 2585 E8 2586 E9 2587 E9 2588 E9 2589 E10 2591 E11 2593 G6 2594 G7 2595 G7 2597 G8 2599 G10 2601 G11 2602 G11 2603 G11 2605 M12 2606 I12 2608 I14 2610 I16 2617 B13 2618 C13 2619 I13 2620 E15 2623 G14 2624 G16 2625 H16 2627 E16 2628 G16 2630 J6 2631 J7 2632 J7 2633 J7 2634 J8 2635 J8 2636 J9 2637 J9 2638 J9 2639 J10 2641 J11 3550 E15 3564 C1 3565 C2 3566 C3 3567 C4 3569 B7 3570 B8 3571 B7 3572 A11 3573 A12 3574 B11 3576 B12 3577 C12 3579 C14 3580 C15 3581 C15 3582 B13 3583 D13 3584 D11 3585 D11 3590 G7 3591 G8 3592 G7 3593 G11 3594 G12 3595 G11 3596 H13 3597 H12 3598 H12 3599 I13 3600 I14 3601 I15 3602 I15 3605 I11 3606 I11 3607 G15 3608 F15 6517 D4 6519 C6 6520 H6 6523 B11 6523 C13 6525 H11 6525 I13 6561 D15 3936 H5 3937 A10 3941 F10 3944 F14

PCB 05

DIGITAL TO ANALOG

TO DECORDING 1

6519 TDA1540

6520 TDA1540

6517 SAA7030 FIL

MAIN CLOCK

TIMING CHAIN

S/P

ROM 96 WORDS

MULTI-PLIER

ACC.

OUTPUT TIMING

P/S

LATCH

10 BITS ACTIVE DAC

4 BITS PASSIVE DAC

SYMMETRY OSCILLATOR

DAC

6523(1/2)(A) NE5532N

6523(1/2)(B) NE5532N

6525(1/2)(A) NE5532N

6525(1/2)(B) NE5532N

PREEM

KILL

BAX18

TO SUPPLY PCB 44-4

TO SUPPLY PCB 44-5

TO SUPPLY PCB 47-1

TO SUPPLY PCB 44-6

TO SUPPLY PCB 44-3

TO SUPPLY PCB 44-2

TO SUPPLY PCB 44-7

TO SUPPLY PCB 44-1

TO SUPPLY PCB 44-8

AF-L

AF-R

ALL CAPACITORS AND RESISTORS ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE

* TO SUPPLY PCB 44-1 MEANS CONNECTED TO THE SUPPLY PCB CONNECTOR 44 POINT 1

35 67907/A

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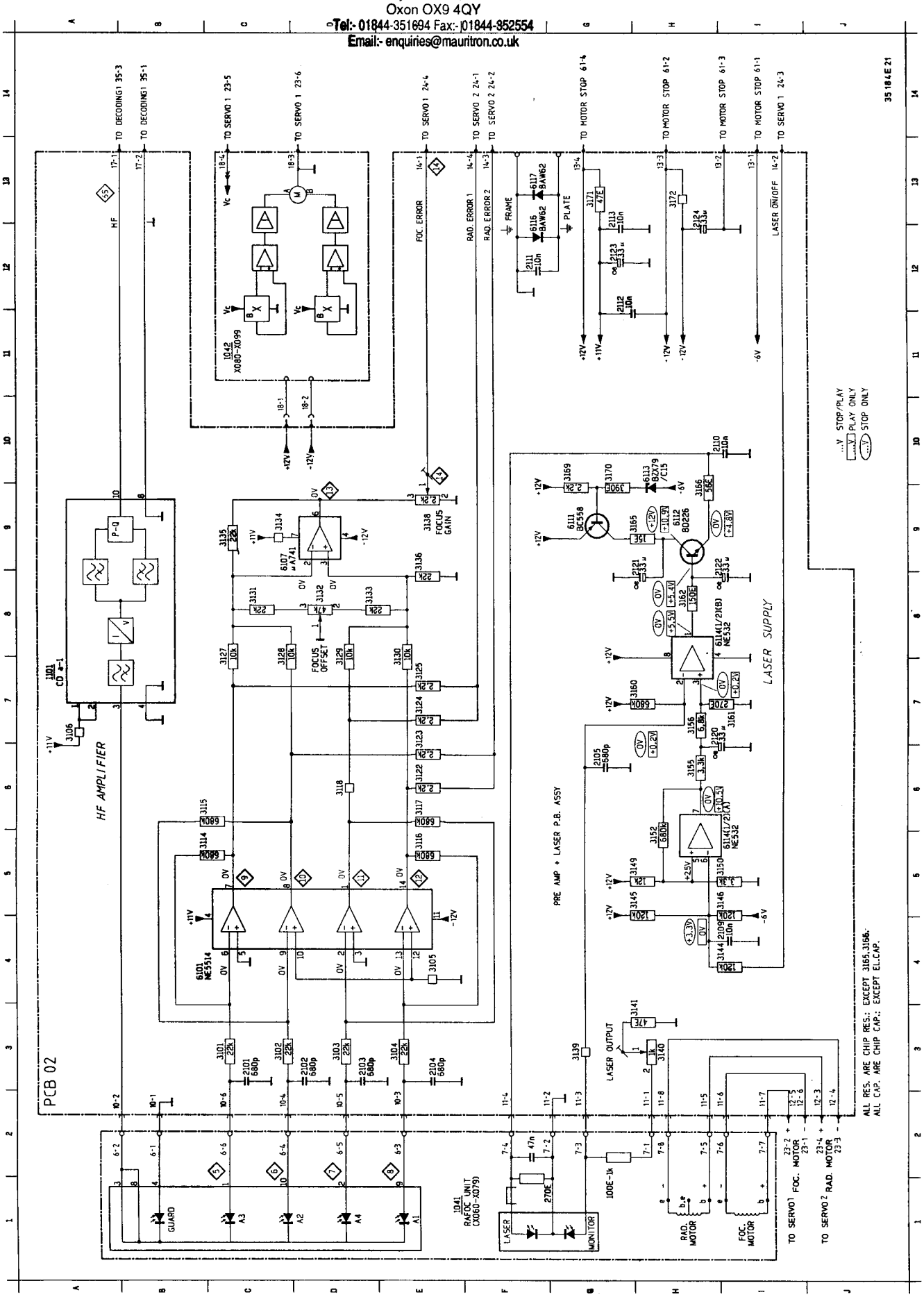
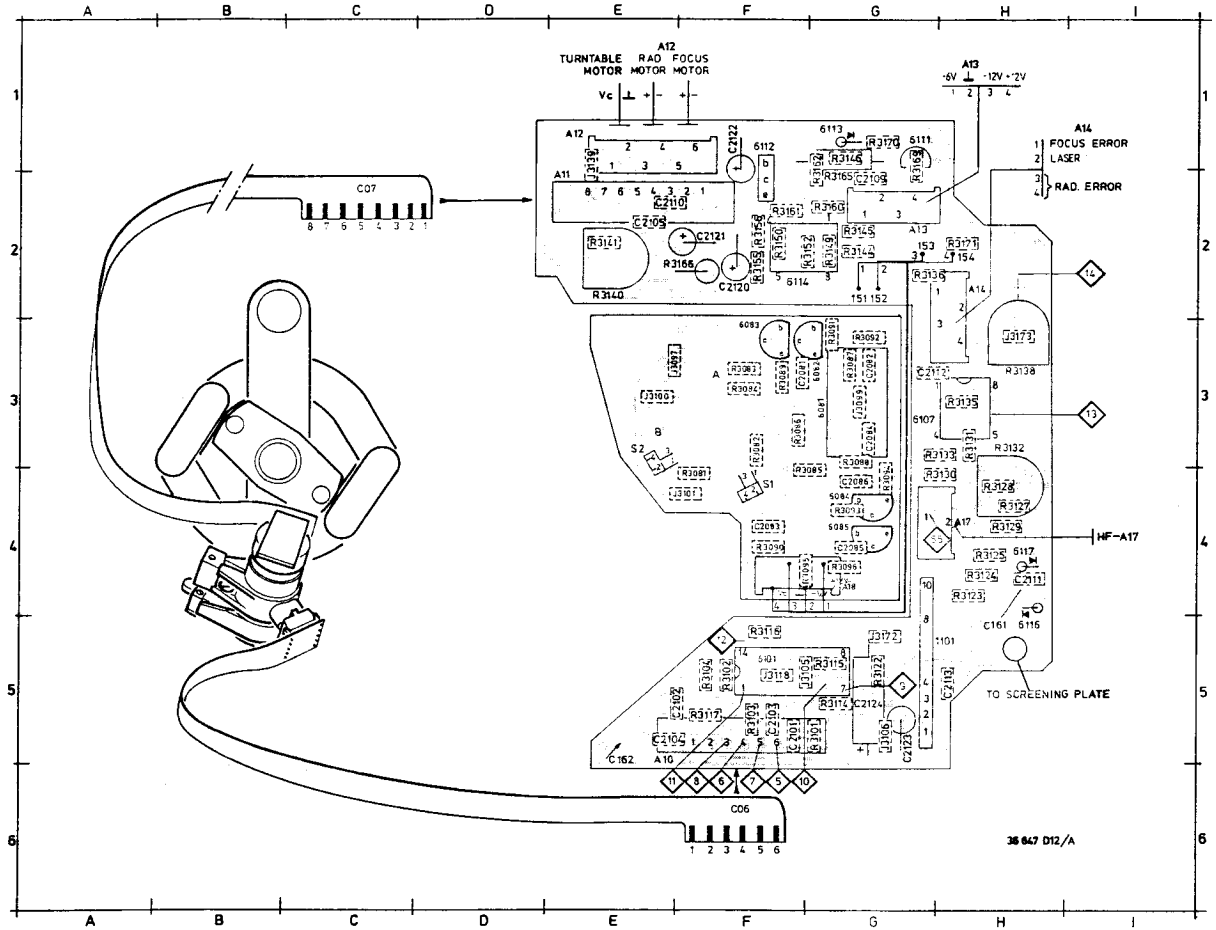
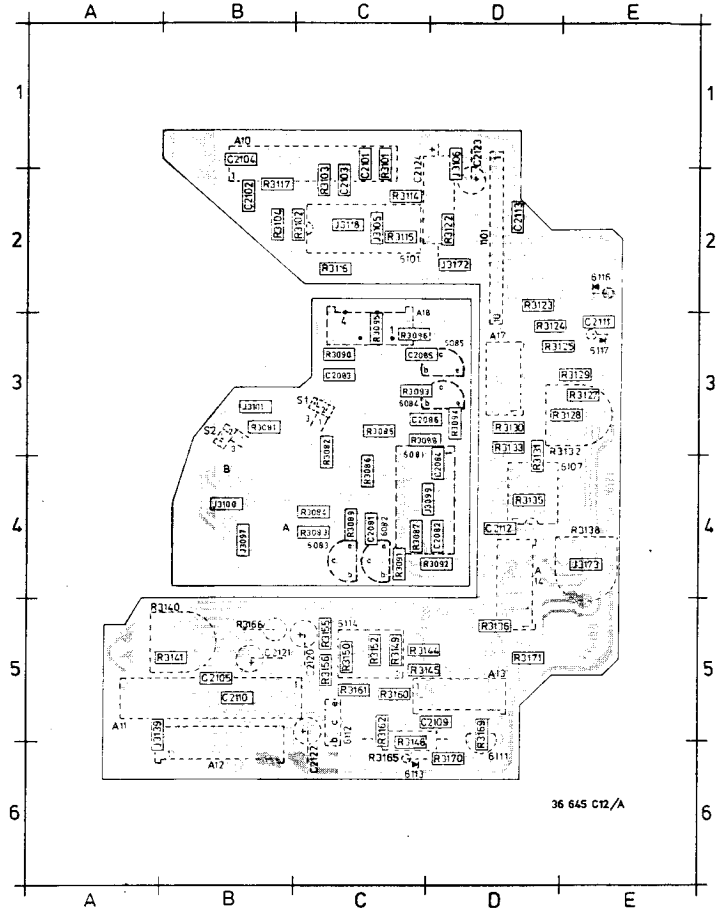
1-13

PRE. AMPL. + LASER



PRE. AMPL. + LASER 8005173 - PCB2





Semi-conductors

17	20	32	102

6082	8320378 **17**	BC 635	
6083	8320632 **17**	BC 636	
6084	8320378 **17**	BC 635	
6085	8320632 **17**	**BC 636**	
6111	8320104 **20**	BC 558	
6112	8320296 **32**	BD 226	
6081	8340157 **102**	LM 324	

IC's

103	136	209	

6101	8340813 **136**	NE 5514
6107	8340141 **103**	µA 741
6114	8340313 **103**	NE 532N
9404	3351000	Hall IC

Diodes

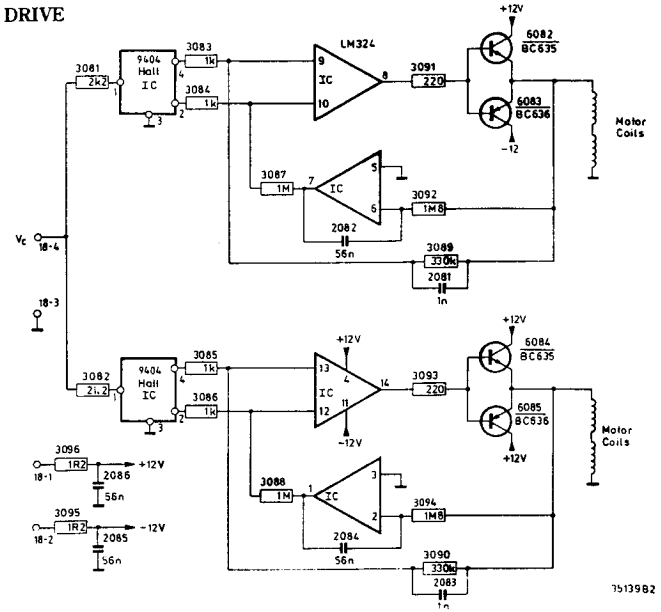
6113	8300313 **209**	BZX79/C15
6116	8300359 **209**	BAW 62
6117		

1101	G5	3089	F3	3132	H4	6085	G4
2081	F3	3090	F4	3133	H3	6101	G5
2082	G3	3091	F3	3135	H3	6107	H3
2083	F4	3092	G3	3136	G2	6111	G1
2084	G3	3093	G4	3138	H3	6112	F1
2085	G4	3094	G4	3139	F2	6113	G1
2086	G4	3095	G4	3140	E2	6114	F2
2101	F5	3096	G4	3141	E2	6116	H5
2102	F5	3097	F3	3144	G2	6117	H4
2103	F5	3099	G3	3145	G2		
2104	E5	3101	F5	3146	G2		
2105	F2	3102	F5	3149	G2		
2109	G2	3103	F5	3150	F2		
2110	E2	3104	F5	3152	G2		
2111	H4	3105	G5	3155	F2		
2112	G3	3106	G5	3156	F2		
2113	G5	3114	G5	3160	G2		
2120	F2	3115	G5	3161	F2		
2121	F2	3116	F5	3162	G2		
2122	F1	3117	F5	3165	G1		
2123	G5	3118	F5	3166	F2		
2124	G5	3122	G5	3169	G1		
3081	F4	3123	H4	3170	G1		
3082	F3	3124	H4	3171	H2		
3083	F3	3125	H4	3172	G5		
3084	F3	3127	H4	3173	H3		
3085	F4	3128	H4	6081	G3		
3086	F3	3129	H4	6082	G3		
3087	G3	3130	H4	6083	F3		
3088	G3	3131	H3	6084	G4		

1101	D2	3089	C4	3132	E3	6085	C3
2081	C4	3090	C3	3133	D3	6101	C2
2082	C4	3091	C4	3135	D4	6107	D4
2083	C3	3092	C4	3136	D5	6111	D6
2084	C4	3093	C3	3138	E4	6112	C6
2085	C3	3094	D3	3139	B5	6113	C6
2086	C3	3095	D3	3140	B5	6114	C5
2101	C1	3096	C3	3141	B5	6116	E2
2102	B2	3097	B4	3144	C5	6117	E3
2103	C1	3099	C4	3145	D5		
2104	B1	3101	C1	3146	C5		
2105	C5	3102	C2	3149	C5		
2109	D5	3103	C1	3150	C5		
2110	B5	3104	B2	3152	C5		
2111	E2	3105	C2	3155	C5		
2112	D4	3106	D1	3156	C5		
2113	C5	3114	C2	3160	C5		
2120	C5	3115	C2	3161	C5		
2121	B5	3116	C2	3162	C5		
2122	C5	3117	B2	3165	C5		
2123	D1	3118	C2	3166	B5		
2124	D2	3122	D2	3169	D6		
3081	C3	3123	D2	3170	D6		
3082	C3	3124	D2	3171	D5		
3083	C4	3125	D2	3172	D2		
3084	C4	3127	E3	3173	E4		
3085	C3	3128	E3	6081	C4		
3086	C4	3129	E3	6082	C4		
3087	C4	3130	D3	6083	C4		
3088	C3	3131	D3	6084	C3		

1-15

DISC MOTOR DRIVE



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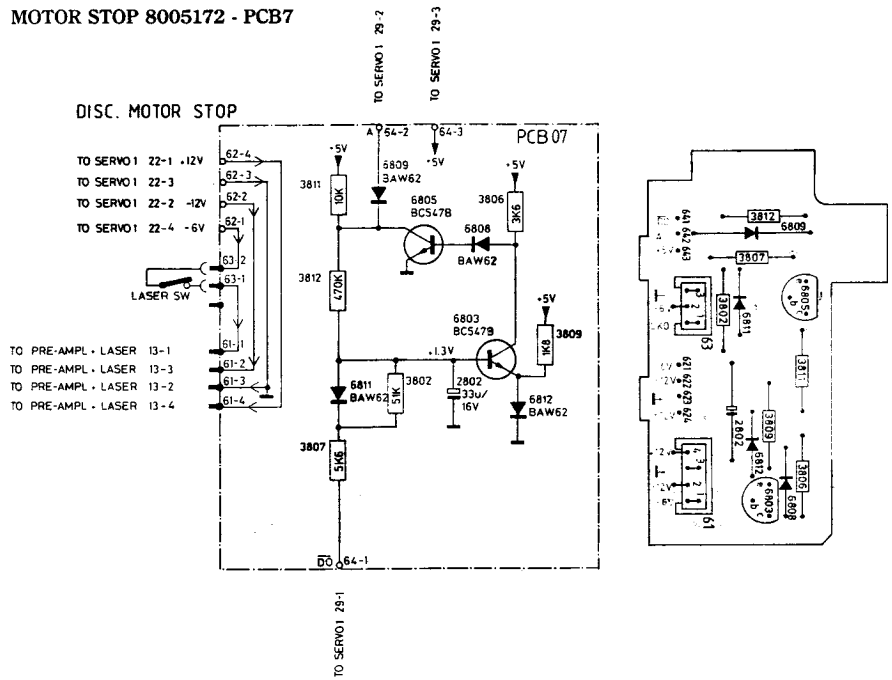
1-15

MOTOR STOP 8005172 - PCB7



Semi-conductors

20	209		

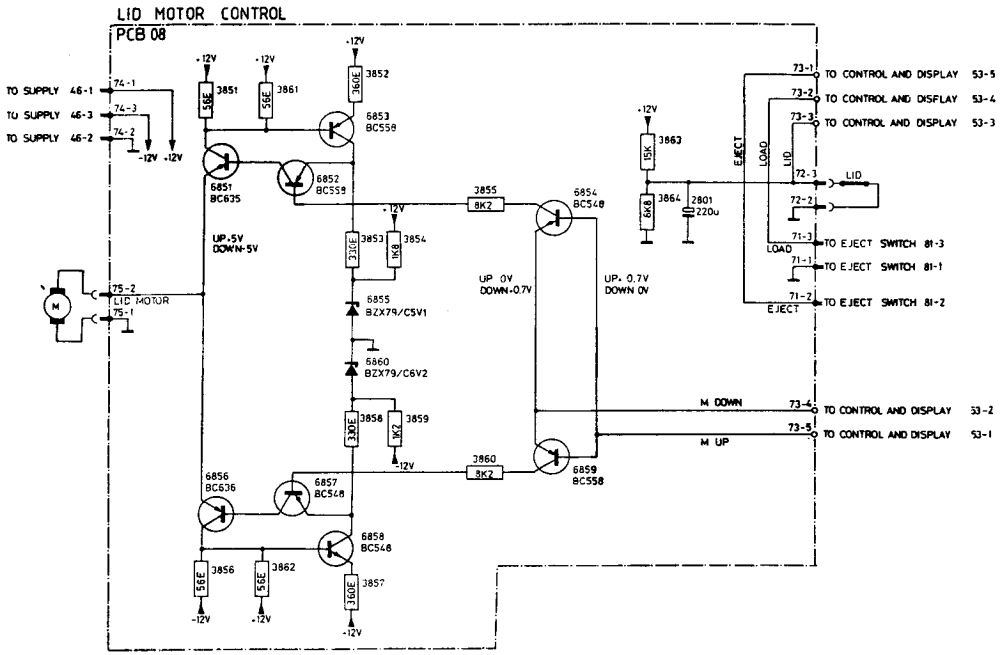
Transistors

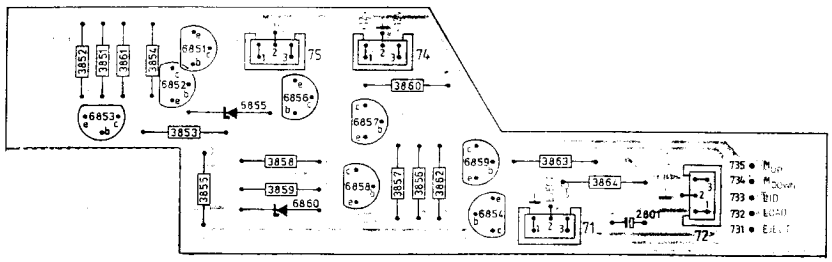
6803	8320097 **20**	BC 547C
6805		

Diodes

6808	8300359 **209**	BAW 62
6809		
6811	8300359 **209**	BAW 62
6812		

MOTOR CONTROL 8005170 - PCB8





Semi-conductors

17	20	209					

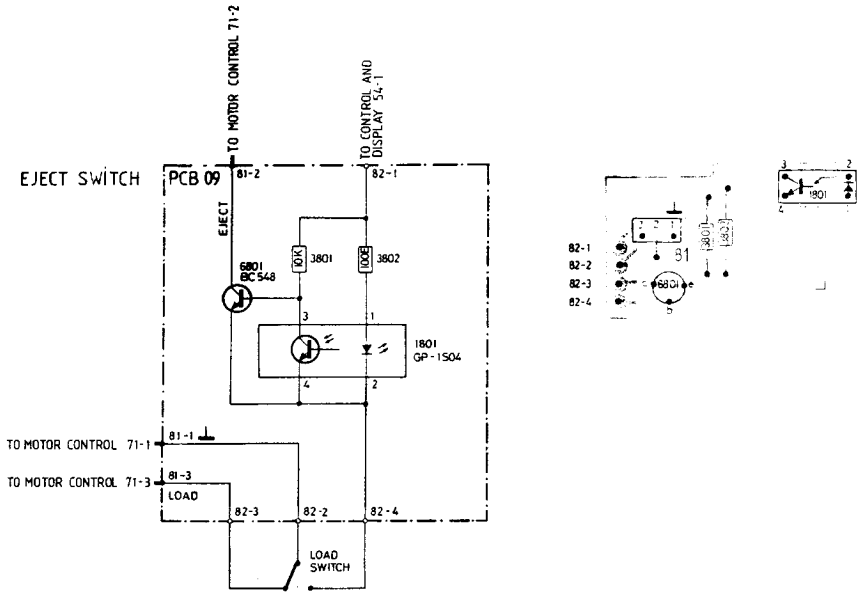
Transistors

6851	8320378	17	BC 635	6856	8320632	17	BC 636
6852	8320104	20	BC 558B	6857	8320108	20	BC 548B
6853				6858			
6854	8320108	20	BC 548B	6559	8320104	20	BC 558B

Diodes

6855	8300169	209	BZX79/C5V1	6850	8300201	209	BZX79/C6V2

EJECT SWITCH 8005174 - PCB9



Transistors

6801	8320108	20	BC 548B

Opto.

1801	8330156		GP-IS04

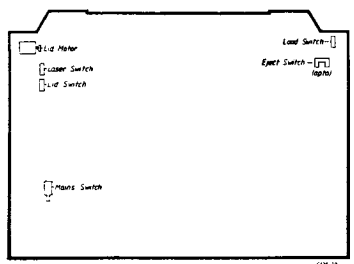
Switch survey

When the top lid is closed, the switches are in the following positions:

LOAD is off
LASER is on
LID is on
EJECT pin 12 of IC6078 is high

When the button EJECT is presse, the following things happen:

LOAD goes on, then EJECT pin 12 of IC6078 goes low as long as the button is pressed. As the lid opens, LASER goes off, and when the lid is in its upper position, LID goes off.



Bang&Olufsen

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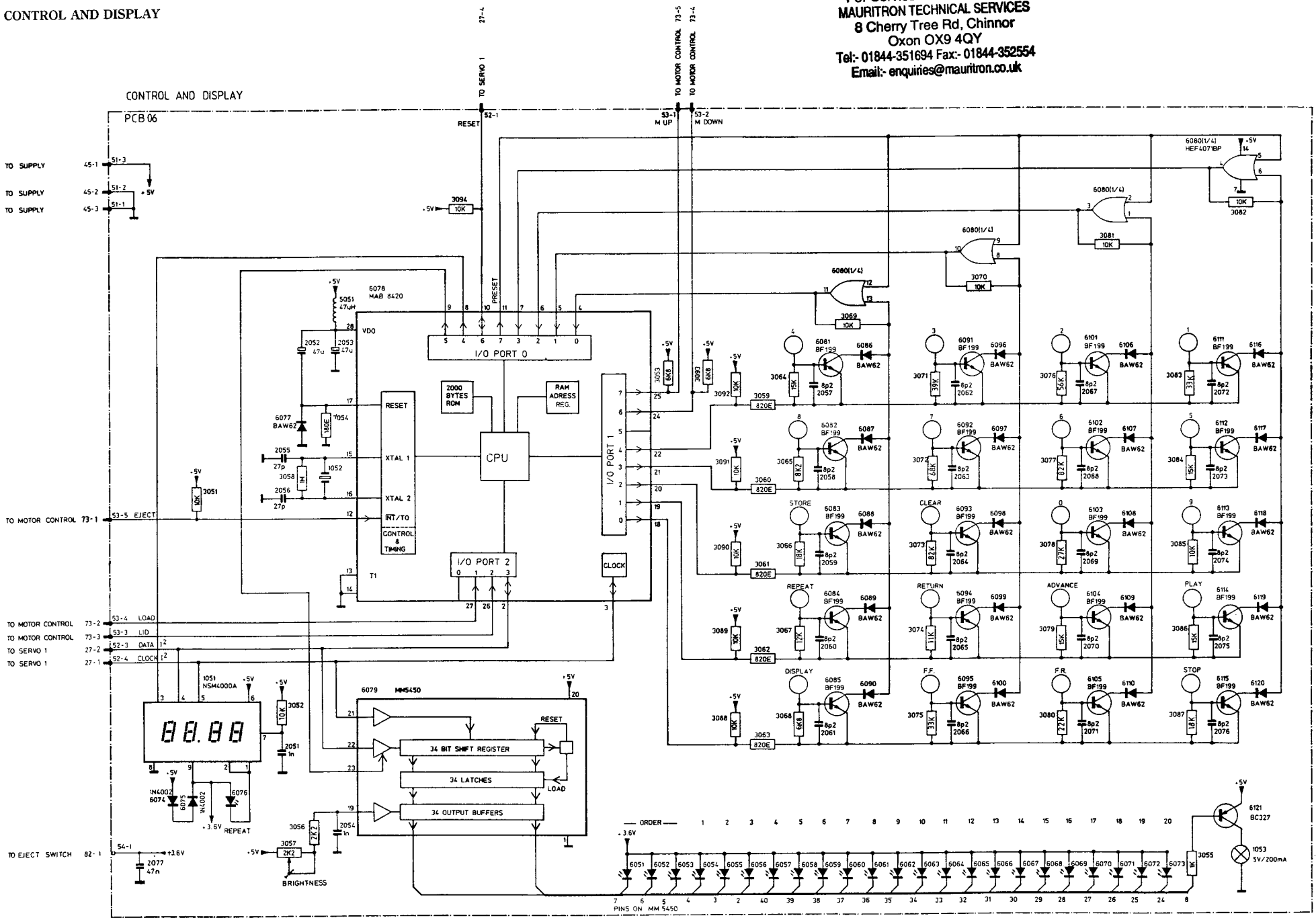
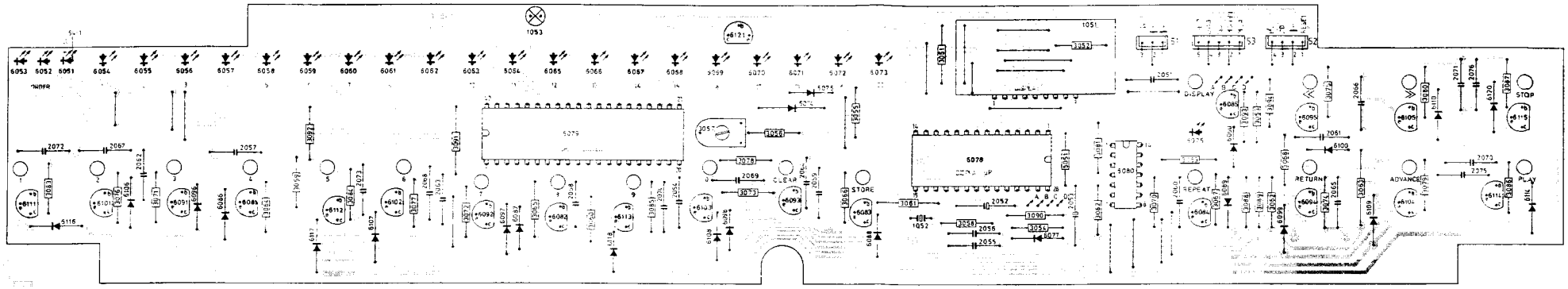
CONTROL AND DISPLAY



CONTROL AND DISPLAY 8005167 · PCB6



Semi-conductors

20	42	124	136	209	230		

Transistors

6081- 6085	8320281	**42**	BF 199	6111 6115	8320281 **42** BF 199
6091- 6095	8320281	**42**	BF 199	6121	8320316 **20** BC 327
6101 6105	8320281	**42**	BF 199		

IC's

6078∆	8340844	**136**	MAB 8440	6080∆	8340816 **136** HEF 4071 BP
6079∆	8340467	**124**	MM 5450N		

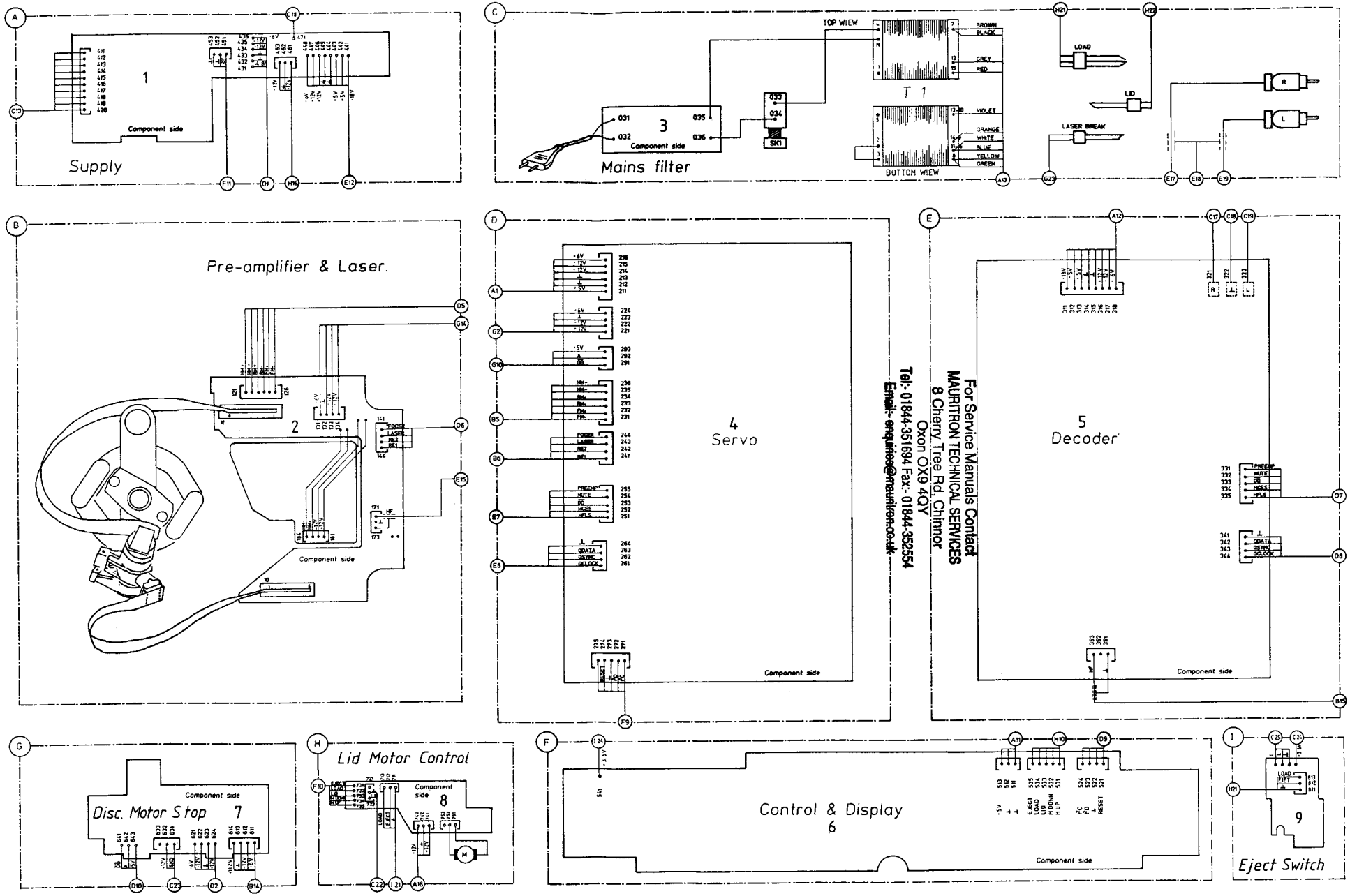
Diodes

6051- 6053	8330143	**30**	Red	6086- 6090	8300359 **209** BAW 62
6054- 6073	8330144	**230**	Green	6096- 6100	8300359 **209** BAW 62
6074 6075	8300023	**209**	1N4002	6106- 6110	8300359 **209** BAW 62
6076	8330143	**230**	Reed	6116- 6120	8300359 **209** BAW 62
6077	8300359	**209**	BAW 62		

Display

1051	8330146		NSM 4000A

WIRING DIAGRAM

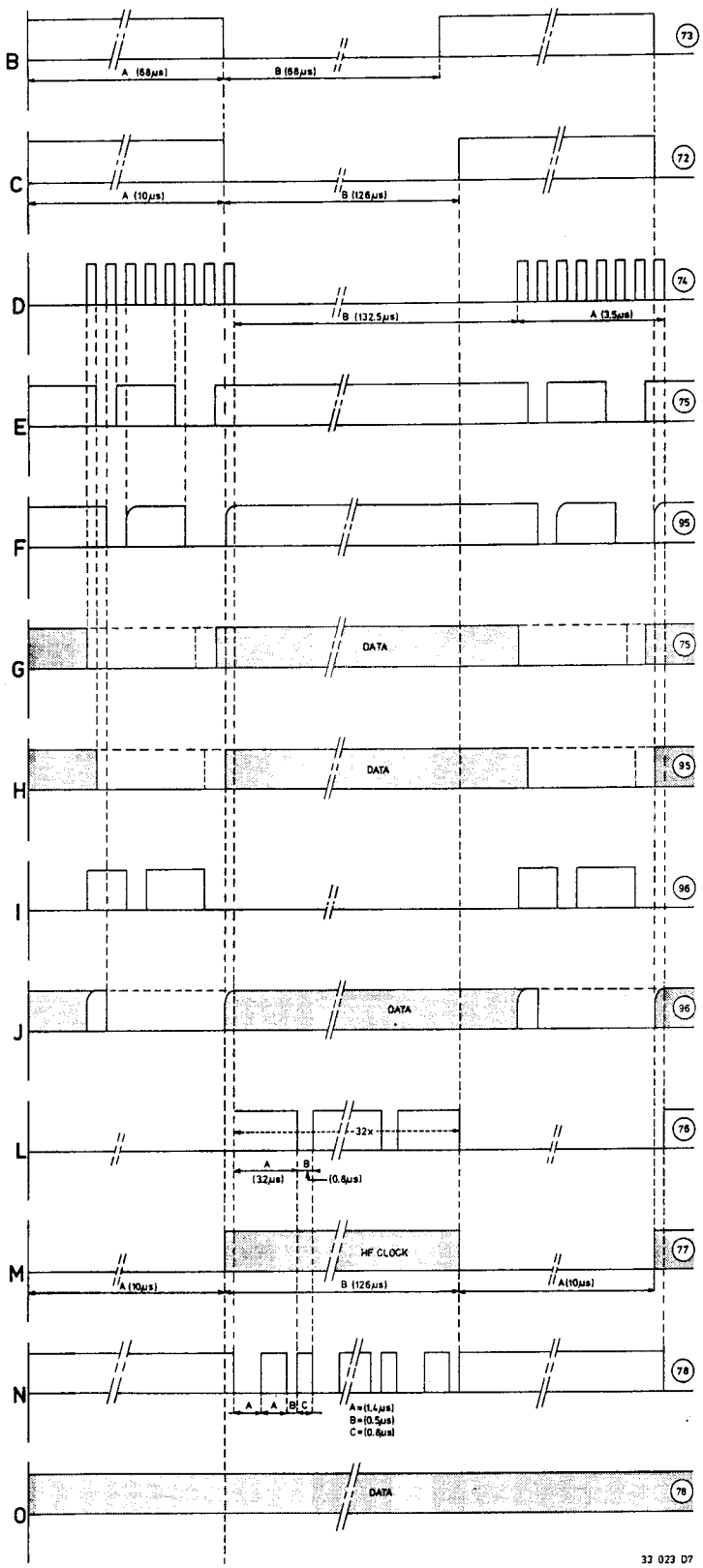


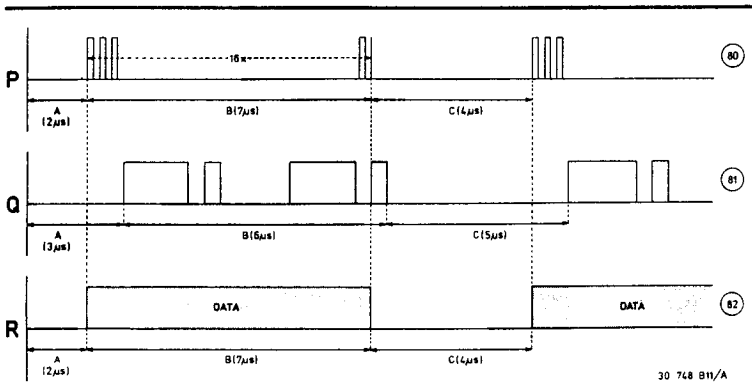
DECODING

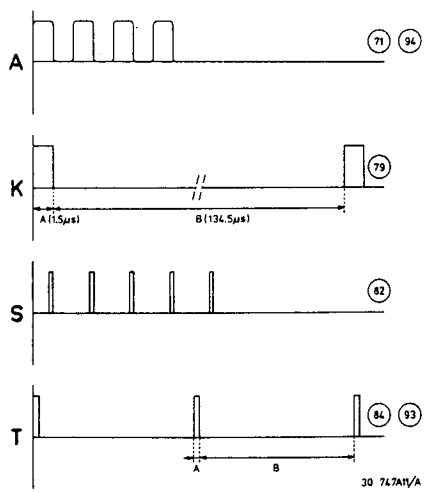
Test Point	See	Position	Amplitude	f	Time base
71	A	pause/play	0-5 V	4,32 MHz	
72	C	pause/play	0-5 V		A = 10* µs B = 126 µs
73	B	pause/play*	0-5 V	7,35 KHz	A = 68 µs B = 68 µs
74	D	pause/play	5-0 V		A = 3,5 µs B = 132,5 µs
75	E	pause	5-0 V		A = 3,5 µs B = 132,5 µs
75	G	play	0-5 V	DATA	
76	L	pause/play	0-5 V		A = 3,2 µs B = 0,8 µs
77	M	pause/play	0-5 V		A = 10 µs B = 126 µs
78	N	pause	0-5 V		A = 1,4 µs B = 0,5 µs C = 0,8 µs
78	O	play	5 V	DATA	
79	K	pause/play	0-5 V		A = 1,5 µs B = 134,5 µs
80	P	pause/play	0-5 V		A = 2 µs B = 7 µs C = 4 µs
81	Q	pause/play	0-5 V		A = 3 µs B = 6 µs C = 5 µs
81	R	play	0-5 V		A = 2 µs B = 7 µs C = 4 µs
82		pause	5 V	DC	
82	S	play with Drop-out test record	0-5 V		
84	T	pause/play	0-5 V		A = 0,5 µs B = 22,5 µs
85	U	pause/play	0-5 V		A = 2 µs B = 7,5 µs
86	V	pause/play	0-5 V		A = 4 µs B = 7,2 µs
86	W	pause/play	0-5 V		DATA
87	V	pause/play	5 V		A = 4 µs B = 7,2 µs
87	W	play	5 V		DATA
90	X	pause/play	0-5		A = 3,2 µs B = 2,4 µs
91	Y	pause	0-5 V		A = 1,2 µs B = 4,4 µs
91	Z	play	0-5 V		A = 3,2 µs B = 2,4 µs
92	Y	pause	0-5 V		A = 1,2 µs B = 4,4 µs
92	Z	play	0-5 V		A = 3,2 µs B = 2,4 µs
93	T	pause/play	0-5 V		A = 0,4 µs B = 5,5 µs
94	A	pause/play	0-5 V	4,23 MHz	
95	F	pause	5-0 V		
95	H	play	5-0 V		
96	I	pause	0-5 V		
96	J	play	5-0 V		

* In pos. pause, signal is only present **after** the set was brought in play mode.

1-20







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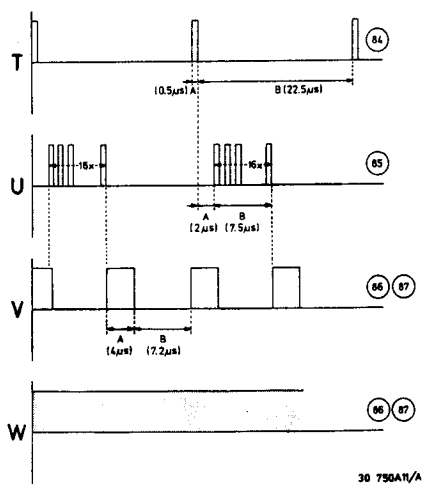

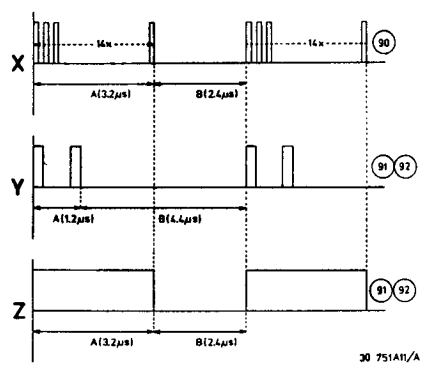

1-21

SERVO

Test point	See	Position	Amplitude	f	Time base
29	P	stop	0.3 Vp-p		
39	L	play	0-4 Vp-p		A = 769 µs B = 769 µs
40	M	play	0-4 Vp-p		A = 769 µs B = 769 µs
41	N	play	6 Vp-p		A = 769 µs B = 769 µs
45	P	stop	9 Vp-p	650 Hz	
46	Q	stop	0-5 V	650 Hz	A = 769 µs B = 769 µs
47	P	stop	1.5 Vp-p	650 Hz	
48	P	stop	1 Vp-p	650 Hz	
49	R	stop	0-5 V	650 Hz	
50	S	stop	0-5 V	650 Hz	
51	T	stop	5-0 V	650 Hz	
55	W	play	5-0 V		
56	W	play (with drop out test record)	5-0 V		
65	A	play	1 Vp-p		
66	F	play	0.25-2.5 V		A = 140 µs

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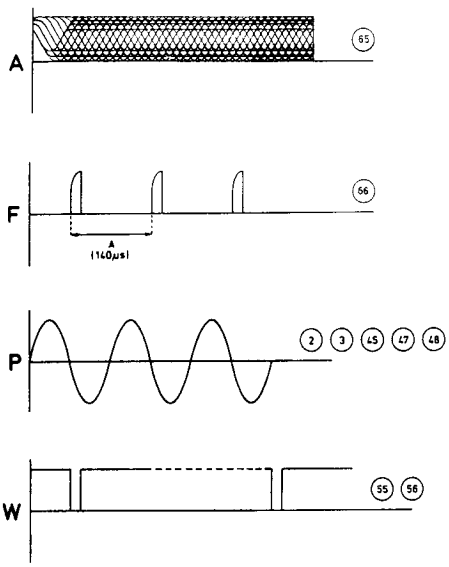
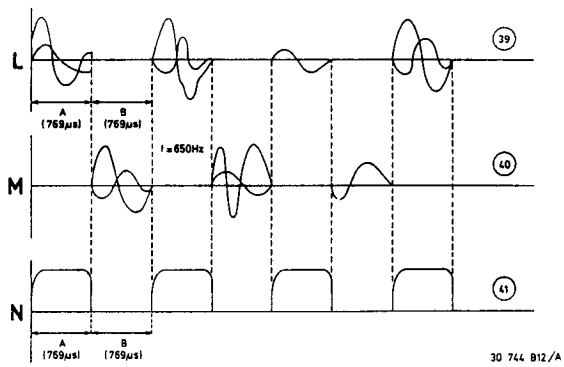
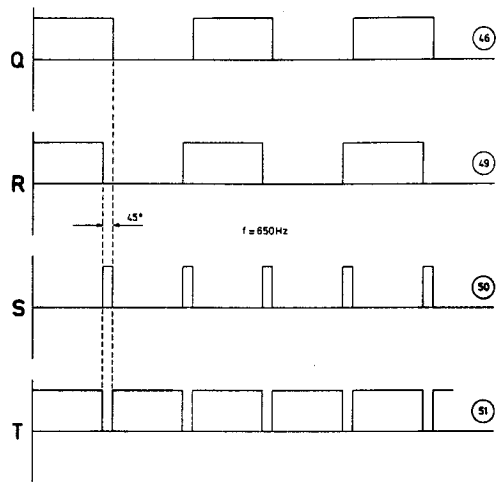
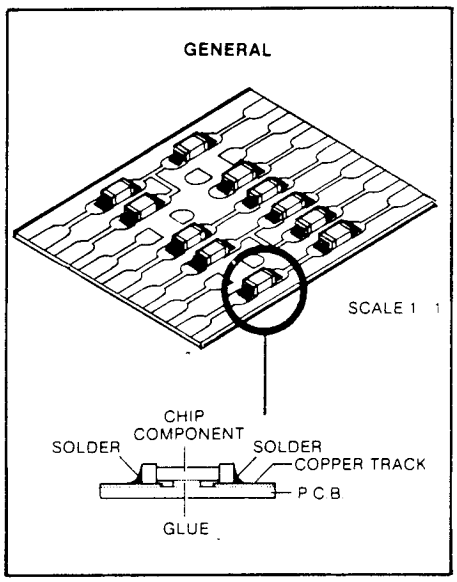

A
65
F
66
A
(140µs)
P
2
3
45
47
48
W
55
56

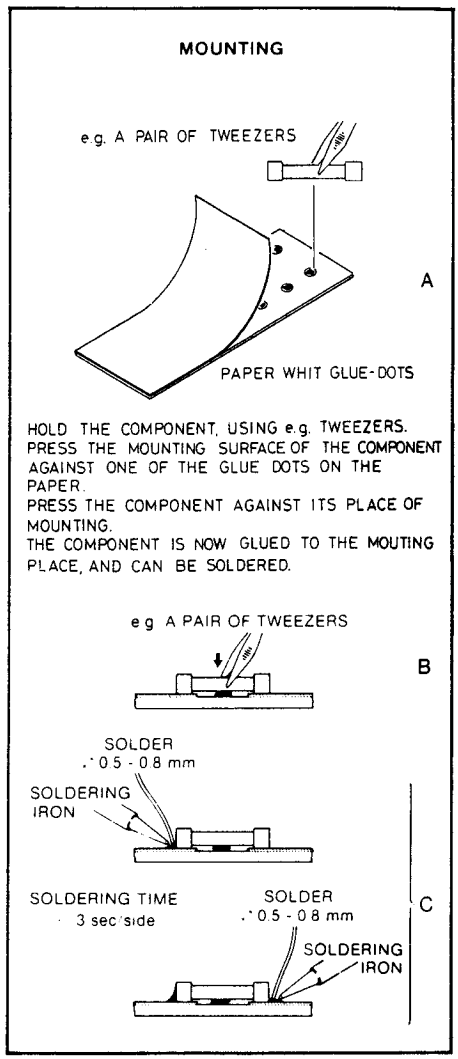

L
39
A
(769µs)
B
(769µs)
f = 650Hz
M
40
N
41
A
(769µs)
B
(769µs)
30 744 812/A

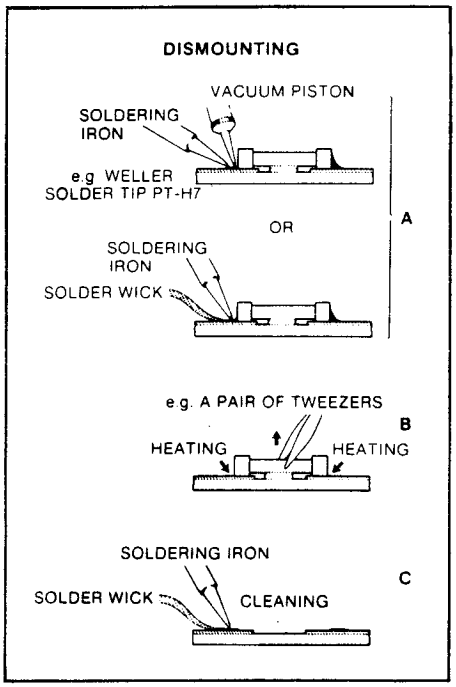

Q
46
R
49
45°
f = 650Hz
S
50
T
51

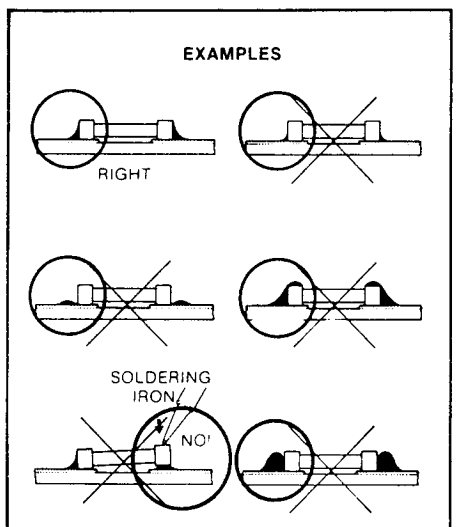
LIST OF ELECTRICAL PARTS

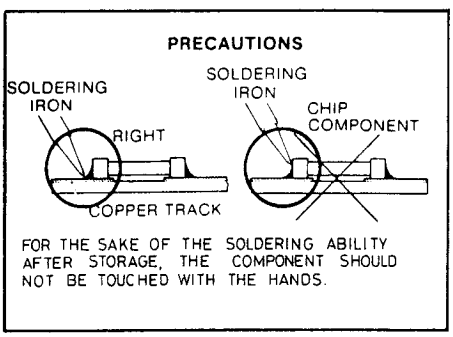
In the player chip components have been applied. For insertion and removal of chip components see the figure below




MOUNTING
e.g. A PAIR OF TWEEZERS
A
PAPER WHIT GLUE-DOTS
HOLD THE COMPONENT, USING e.g. TWEEZERS.
PRESS THE MOUNTING SURFACE OF THE COMPONENT AGAINST ONE OF THE GLUE DOTS ON THE PAPER.
PRESS THE COMPONENT AGAINST ITS PLACE OF MOUNTING.
THE COMPONENT IS NOW GLUED TO THE MOUTING PLACE, AND CAN BE SOLDERED.
e.g. A PAIR OF TWEEZERS
B
SOLDER
.˙0.5 - 0.8 mm
SOLDERING IRON
SOLDERING TIME
3 sec'side
SOLDER
.˙0.5 - 0.8 mm
SOLDERING IRON
C






PRECAUTIONS
SOLDERING IRON
RIGHT
SOLDERING IRON
CHIP COMPONENT
COPPER TRACK
FOR THE SAKE OF THE SOLDERING ABILITY AFTER STORAGE, THE COMPONENT SHOULD NOT BE TOUCHED WITH THE HANDS.

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Chip capacitor

27pF	4000244	1.5nF	4000251
33pF	4000245	2.2nF	4000252
39pF	4000246	5.6nF	4000253
68pF	4000247	10nF	4000254
100pF	4000248	22nF	4000255
470pF	4000249	100nF	4000256
820pF	4000250		

Chip resistor 2% 0,125W 1206

2.2 Ω	5011216	13 kΩ	5011242
3.3 Ω	5011217	15 kΩ	5011243
47 Ω	5011269	18 kΩ	5011244
82 Ω	5011270	22 kΩ	5011245
100 Ω	5011218	24 kΩ	5011246
120 Ω	5011219	27 kΩ	5011247
150 Ω	5011220	33 kΩ	5011248
390 Ω	5011221	36 kΩ	5011249
470 Ω	5011222	47 kΩ	5011250
560 Ω	5011223	56 kΩ	5011251
620 Ω	5011224	68 kΩ	5011252
680 Ω	5011225	75 kΩ	5011253
820 Ω	5011226	82 kΩ	5011254
		91 kΩ	5011255
1 kΩ	5011227	100 kΩ	5011256
1.5 kΩ	5011228	120 kΩ	5011257
1.8 kΩ	5011229	130 kΩ	5011258
2.2 kΩ	5011230	150 kΩ	5011259
2.7 kΩ	5011231	180 kΩ	5011260
3.3 kΩ	5011232	220 kΩ	5011261
3.9 kΩ	5011233	270 kΩ	5011262
4.7 kΩ	5011234	330 kΩ	5011263
5.1 kΩ	5011235	360 kΩ	5011264
5.6 kΩ	5011236	470 kΩ	5011265
6.2 kΩ	5011237	820 kΩ	5011266
6.8 kΩ	5011238		
7.5 kΩ	5011239	1 MΩ	5011267
8.2 kΩ	5011240	5.6 MΩ	5011268
10 kΩ	5011241		

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Each parts number for chip component includes 10 pieces and glue dots.

Carbon film 0.2 W	70°C	5%	
Carbon film 0.33 W	70°C	5%	
Metal film 0.33 W	70°C	5%	
Carbon film 0.5 W	70°C	5%	
Carbon film 0.67 W	70°C	5%	
Carbon film 1.15 W	70°C	5%	

© Chip component

Ceramic plate Tuning ⩽ 120 pF NP.0		2%
Others		—20/+80%
Polyester flat foil		10%
Metalized polyester flat film		10%
Polyester flat foil small size (Mylar)		10%
Polysterene film/foil		1%
Tubular ceramic		
Miniature single		
Subminiature tantalum		± 20%

*a	= 2,5 V
b	= 4 V
c	= 6,3 V
d	= 10 V
e	= 16 V
f	= 25 V
g	= 40 V
h	= 63 V
j	= 100 V
l	= 125 V
m	= 150 V
n	= 160 V
q	= 200 V
r	= 250 V
s	= 300 V
t	= 350 V
u	= 400 V
v	= 500 V
w	= 630 V
x	= 1000 V
A	= 1,6 V
B	= 6 V
C	= 12 V
D	= 15 V
E	= 20 V
F	= 35 V
G	= 50 V
H	= 75 V
I	= 80 V

Power Supply 8005168 - PCB1

2451	4200220	33 µF 16V	2463	4010162	47 nF 50V
2452	4200220	33 µF 16V	2464	4010162	47 nF 50V
2453	4200121	22 µF 40V	2465	4010162	47 nF 50V
2454	4200220	33 µF 16V	2466	4010169	220 µF 25V
2455	4200220	33 µF 16V	2467	4010162	47 nF 50V
2456	4200220	33 µF 16V	2468	4010162	47 nF 50V
2457	4200642	1500 µF 25V	2469	4010163	22 nF 100V
2458	4200612	1000 µF 25V	2470	4010163	22 nF 100V
2469	4200641	3300 µF 16V	2471	4010162	47 nF 50V
2460	4200642	1500 µF 16V	2472	4010162	47 nF 50V
2461	4200641	3300 µF 16V	2473	4030020	1 nF 30V
2462	4010162	47 nF 50V			

	P41	7220316	Plug 10 pol.			
Pre. Ampl. & Laser 8005173 - PCB2	3132	5370061	47 kΩ 20%	3146	5010047	120 kΩ 5% 1/4W
	3138	5370006	2.2 kΩ 20%	3166	5020580	56 Ω 5% 1W
	3140	5370050	1 kΩ 20%			
	2120	4200414	33 µF 16V	2123	4200414	33 µF 16V
	2121	4200414	33 µF 16V	2124	4200414	33 µF 16V
	2122	4200414	33 µF 16V			
	1101	8005175	Thick film			
	A11	7220472	Plug 8pol.	A12	7220471	Plug 6pol.
Mains Filter 8005169 - PCB3	2701	4010123	1 nF 400V	2703	4100253	100 nF 250V
	1701	6600037	Fuse 200mA		7500214	Fuse holder
		6600059	Fuse 400mA			
	5451	6850162	Coil 2x25mH			
	92T1	8013352	Transformer 5121/22/25	92F1	6609021	Thermal fuse 5121/22/25
		8013372	Transformer 5123		6609022	Thermal fuse 5123
Servo 8005165 - PCB4	3228	5011280	150 kΩ SFR 16T	3335	5010062	68 kΩ 5% 1/4W
	3229	5011278	2.7 kΩ SFR 16T	3341	5010935	10 kΩ 5% 1/4W
	3230	5010135	18 kΩ 5% 1/4W	3363	5010935	10 kΩ 5% 1/4W
	3256	5020761	4.7 Ω 5% 1/4W	3379	5010935	10 kΩ 5% 1/4W
	3273	5020761	4.7 Ω 5% 1/4W	3384	5011277	9.4 Ω PTC 60V
	3291	5011279	47 kΩ SFR 16T	3385	5011277	9.4 Ω PTC 60V
	2203	4200632	10 µF 10V	2237	4130302	33 nF 10% 63V
	2204	4130224	100 nF 10% 63V	2238	4100114	5.6 nF 2% 63V
	2205	4100048	27 nF 1% 63V	2239	4100042	390 pF 2% 630V
	2207	4200640	33 µF 40V	2243	4130293	470 nF 10% 63V
	2208	4010159	47 nF 50V	2244	4100259	680 pF 2% 250V
	2209	4200639	47 µF 25V	2246	4100025	6.8 nF 2% 63V
	2211	4130224	100 nF 10% 63V	2247	4100025	6.8 nF 2% 63V
	2214	4200486	4.7 µF 50V	2250	4200414	33 µF 16V
	2215	4100262	390 nF 10% 100V	2251	4130224	100 nF 10% 63V
	2216	4130302	33 nF 10% 63V	2256	4100195	1.8 nF 2% 63V
	2217	4200633	6.8 µF 16V	2257	4100025	6.8 nF 2% 63V
	2218	4130302	33 nF 10% 63V	2261	4100025	6.8 nF 2% 63V
	2219	4130224	100 nF 10% 63V	2262	4100025	6.8 nF 2% 63V
	2220	4200634	33 µF 10V	2264	4200640	33 µF 40V
	2228	4200638	1 µF 25V	2265	4200640	33 µF 40V
	2233	4130293	470 nF 10% 63V	2266	4200640	33 µF 40V
	2236	4100114	5.6 nF 2% 63V	2267	4130155	1000 nF 10% 100V
	1201	8090022	6.000MHz			
	5201	6850160	Coil 47uH	5203	6850160	Coil 47uH
	5202	6850160	Coil 47uH			
	P21	7220257	Plug 6pol.	P26	7220255	Plug 4pol.
	P22	7220255	Plug 4pol.	P27	7220256	Plug 5pol.
	P23	7220257	Plug 6pol.	P28	7220256	Plug 5pol.
	P24	7220255	Plug 4pol.	P29	7220254	Plug 3pol.
	P25	7220256	Plug 5pol.			
		2391066	Spring for TR		7200056	Socket for IC

Decoder 8005166 - PCB5

3574	5010066	1.8 kΩ 5% 1/4W	2583	5010065	100 Ω 5% 1/4W
3582	5010065	100 Ω 5% 1/4W	3595	5010066	1.8 kΩ 5% 1/4W

2501	4200646	22 nF 1% 63V	2580	4130293	0.47 µF 10% 63V
2502	4200646	22 nF 1% 63V	2581	4130293	0.47 µF 10% 63V
2504	4200121	22 µF 40V	2593	4200121	22 µF 40V
2507	4200121	22 µF 40V	2601	4200648	5.1 nF 1% 63V
2513	4200121	22 µF 40V	2602	4200649	15 nF 1% 63V
2515	4200426	1 µF 50V	2603	4100146	2.2 nF 1% 63V
2517	4200121	22 µF 40V	2605	4100146	2.2 nF 1% 63V
2518	4200647	150 µF 6.3V	2606	4200650	1.2 nF 1% 63V
2519	4200121	22 µF 40V	2608	4200121	22 µF 40V
2558	2400121	22 µF 40V	2624	4200121	22 µF 40V
2566	4200648	5.1 nF 1% 63V	2625	4200121	22 µF 40V
2567	4200649	15 nF 1% 63V	2627	4200121	22 µF 40V
2568	4100146	2.2 nF 1% 63V	2628	4200121	22 µF 40V
2570	4100146	2.2 nF 1% 63V	2630	4130293	0.47 µF 10% 100V
2571	4200650	1.2 nF 1% 160V	2631	4130293	0.47 µF 10% 100V
2573	4200121	22 µF 40V			

1504	8090047	4.2336MHz	1510	7600086	Relay
1507	7600086	Relay			

5501	6850161	Coil	5504	6850160	Coil 47uH
5503	6850160	Coil 47uH	5505	6850160	Coil 47uH

P31	7220328	Plug 8pol.	P35	7220254	Plug 3pol.
P33	7220256	Plug 5pol.	P36	7220257	Plug 6pol.
P34	7220255	Plug 4pol.			

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Control and Display 8005167 - PCB6

3057	5370006	2.2 kΩ 20%			

2051	4200645	1 nF 20% 50V	2064	4200643	8.2 pF 10% 50V
2052	4200364	47 µF 10V	2065	4200643	8.2 pF 10% 50V
2053	4200364	47 µF 10V	2066	4200643	8.2 pF 10% 50V
2054	4200645	1 nF 20% 50V	2067	4200643	8.2 pF 10% 50V
2055	4200644	27 pF 5% 50V	2068	4200643	8.2 pF 10% 50V
2056	4200644	27 pF 5% 50V	2069	4200643	8.2 pF 10% 50V
2057	4200643	8.2 pF 10% 50V	2070	4200643	8.2 pF 10% 50V
2058	4200643	8.2 pF 10% 50V	2071	4200643	8.2 pF 10% 50V
2059	4200643	8.2 pF 10% 50V	2072	4200643	8.2 pF 10% 50V
2060	4200643	8.2 pF 10% 50V	2073	4200643	8.2 pF 10% 50V
2061	4200643	8.2 pF 10% 50V	2074	4200643	8.2 pF 10% 50V
2062	4200643	8.2 pF 10% 50V	2075	4200643	8.2 pF 10% 50V
2063	4200643	8.2 pF 10% 50V	2076	4200643	8.2 pF 10% 50V

1052	8090022	6.000MHz	5051	6850160	Coil 47uH
1053	8230089	200mA - 5V			

P51	7220254	Plug 3pol.	P53	7220256	Plug 5pol.
P52	7220255	Plug 4pol.			

Motor Stop 8005172 - PCB7

2802	4200414	33 µF 16V			

P61	7220255	Plug 4pol.	P63	7220254	Plug 3pol.

Motor Control 8005170 - PCB8

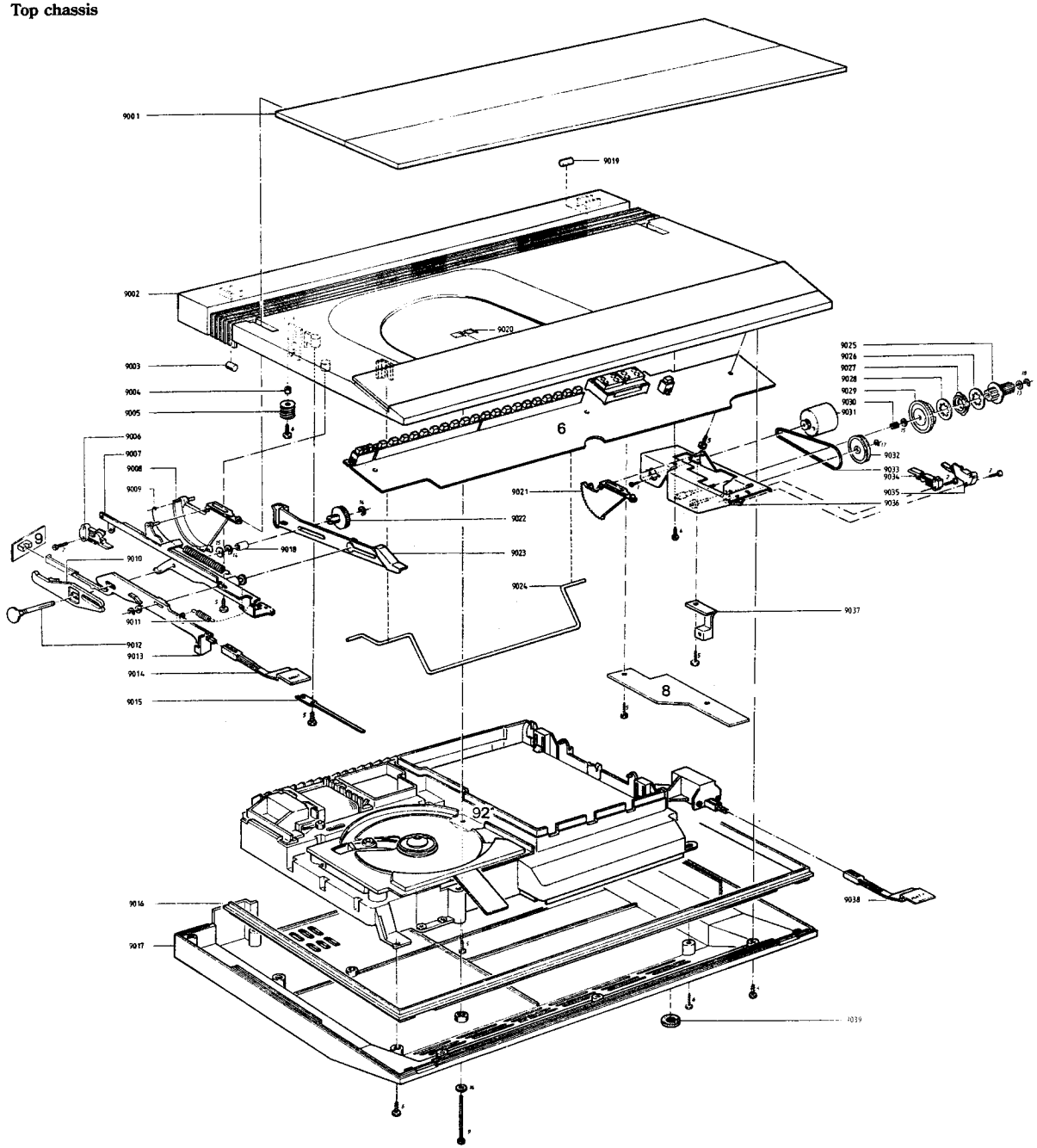
2801	4200122	220 µF 10V			

P71	7220254	Plug 3pol.	P74	7220254	Plug 3pol.
P72	7220254	Plug 3pol.	P75	7220254	Plug 3pol.

Eject Switch 8005174 - PCB9

P82	7220254	Plug 3 pol.			

LIST OF MECHANICAL PART
Top chassis



06Modul	8005167	Control PCB
08Modul	8005170	Motor Control PCB

9001	3162248	Dust cover
9002	3430353	Cabinet
9003	3341052	Plug
9004	2930094	Bushing
9005	2709006	Worm
9006	7400320	Switch
9007	3124103	Mount. plate
9008	3030089	Hinge plate
9009	2810202	Spring, long
9010	2854113	Arm
9011	2810201	Spring, short
9012	2834092	Shaft
9013	2854112	Arm
9014	2854116	Arm
9015	2815018	Leaf spring
9016	3430354	Frame
9017	3454403	Bottom
9018	2930095	Bushing
9019	3341052	Plug
9020	3370151	Window
9021	3030090	Hinge plage
9022	2700043	Gear wheel
9023	2854114	Arm
9024	2514053	Bracket
9025	2700045	Gear wheel
9026	2802045	Ring
9027	2802046	Ring
9028	2802045	Ring
9029	2700044	Gear wheel
9030	2812109	Spring
9031	8400143	Motor
9032	2722037	Pulley
9033	2732078	Belt
9034	7400320	Switch
9035	7400320	Switch
9036	3174102	Mount. plate
9037	3152508	Holder
9038	2854115	Arm
9039	3035045	Foot
9040	3370151	Window

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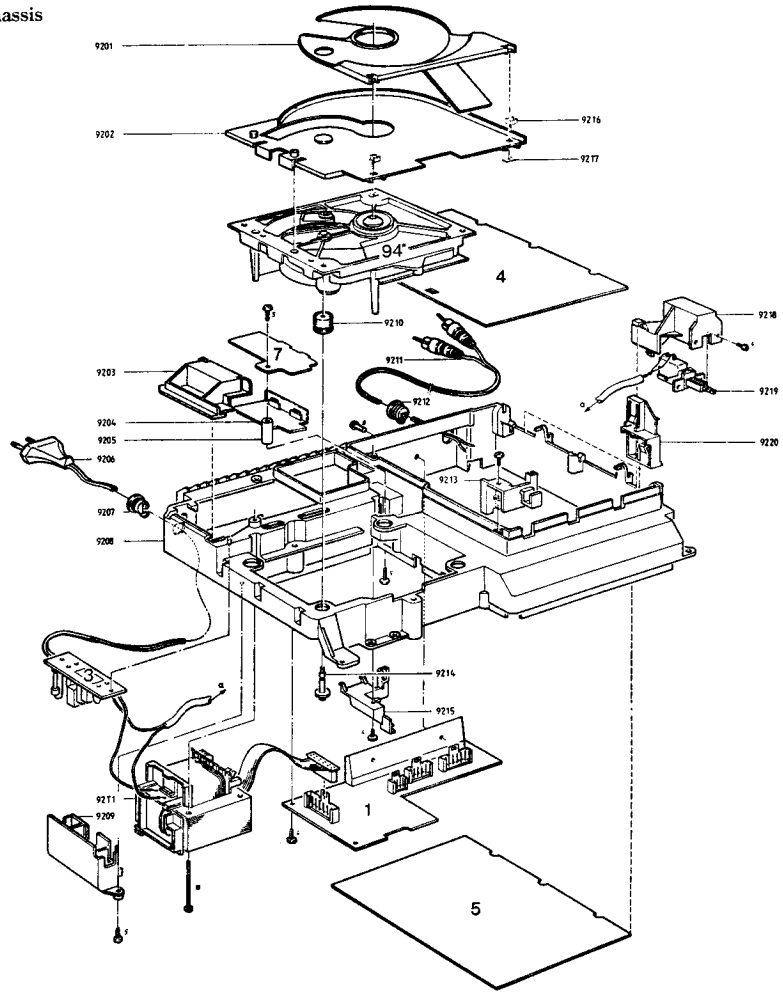
3-2

3-2

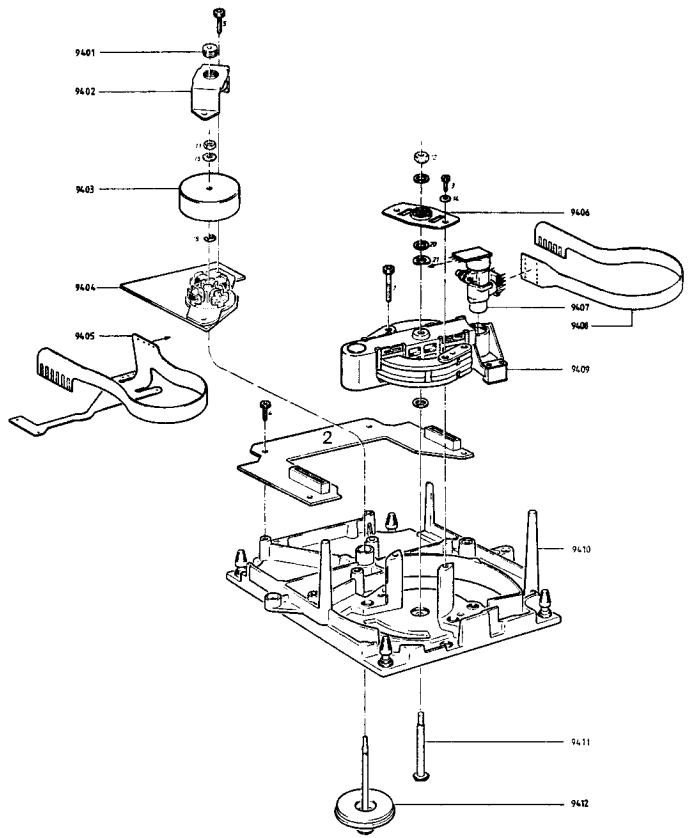
Main chassis



01Modul	8005168	Supply PCB			
03Modul	8005169	Main Filter PCB			
04Modul	8005165	Servo PCB			
05Modul	8005166	Decoder PCB			
07Modul	8005166	Motor stop PCB			
09Modul	8005174	Eject Switch PCB			
9201	3458401	Disc. platte	9206	6271102	Mains cable 5122/22
9202	3458399	Top plate		6270251	Mains cable 5123
9203	3162249	Cover		6271091	Mains cable 5125
9204	3152491	Holder	9207	2641119	Holder
9205	2938244	Distance bushing	9208	3114259	Chassis
9209	3131263	Housing	9215	3152490	Holder
9210*	2938239	Rubber bushing	9216	3030094	Hinge
9211	6270274	Signal lead	9217	2395051	Locking plate
9212	2641119	Holder	9218	3131262	Housing
9213	3152489	Holder	9219	7400321	Switch
9214	2039077	Screw	9220	3152488	Holder
92T1	8013352	Transformer 5121/22/25	92F1	6609021	Thermal fuse 5121/22/25
	8013372	Transformer 5123		6609022	Thermal fuse 5123

Upon replacement see servicetips page 8-1

Mechanism



02Modul	8005173	Pre. ampl. laser			
9401	2072107	Adjustment screw	9407*Δ	8330149	Light pin
9402	2510154	Bracket	9408	6141141	Flex print
9403	2871000	Rotor	9409	3131272	Housing
9404	3351000	Stator	9410	3114260	Chassis
9405	6141142	Flex print	9411	2038093	Bearing screw
9406	2905114	Spring	9412	2726153	Platter

Upon replacement see service tips page 8-2

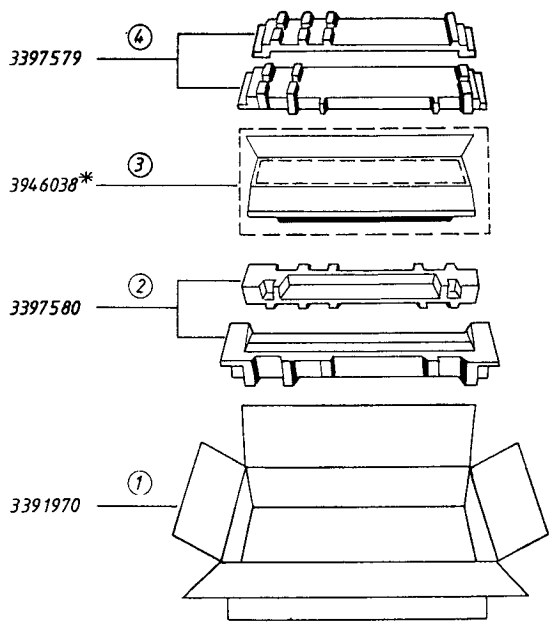
Parts not shown

	3397579	Foam packing, upper	3634028	Laser simulator
	3397580	Foam packing, bottom	3634029	Mirror
	3391970	Wrapper	3634030	Glass disc
	3629107	Blade T6 short	3634031	Test disc
	3629037	Blade T8 short	3634032	Disc hold-down
	3629102	Blade T10 long	3505412	Owner's Manual DK
	3629038	Blade T10 short	3505413	Owner's Manual S
	3629103	Blade T20 short	3505414	Owner's Manual SF
	3629109	Screw driver T6	3505415	Owner's Manual GB
	3629108	Screw driver T8	3505416	Owner's Manual D
	3629047	Screw driver T10	3505417	Owner's Manual NL
	3629104	Screw driver T20	3505418	Owner's Manual F
	3634027	Support		

Screws, washers, etc.

1	2034073	Screw 2x3 DIN 84	11	2380129	Nut M2.5
2	2034074	Screw AM 2x3 DIN 7985	12	2380016	Nut M4
			13	2622348	Washer 2.2
3	2036058	Screw 2.5x6	14	2622218	Washer 3.2
4	2013126	Screw 2.9x8	15	2622390	Washer 4.3
5	2013127	Screw 2.9x9.5	16	2622035	Washer 2.7
6	2013130	Screw 2.9x13	17	2390094	Locking ring 1.5
7	2039078	Screw 2.9x18	18	2390001	Locking ring 2.5
8	2038220	Screw 3x12 DIN 84	19	2390002	Locking ring 3.0
9	2013131	Screw 2.9x45	20	2622399	Washer 3.5
10	2043036	Screw 4x35	21	2623002	Washer 3.5

Packing procedure



**Foile 3946038 is solde by the metre*

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Lubrication

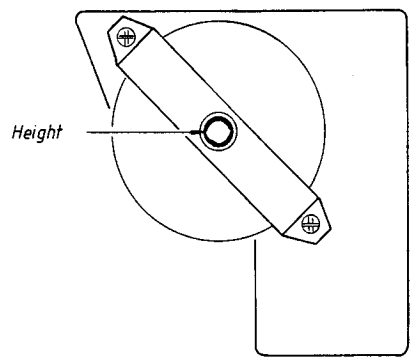
1. Arm 9011 sliding surface towards 9013
   Bracket 9007 sliding surface towards 9013
   Silocone paste P4

2. Arm 9008 sliding surface towards 9007 Isoflex PDL250

MECHANICAL ADJUSTMENTS

Height setting of the turntable

For this alignment the unit should be in the position of normal end use.
The servicing supports 3634027 can be used here.
Playback track 1 of disc 3634031. (Disc without defects).
Connect a DC voltmeter between the *negative* of the focus motor and earth of the preamplifier print.
Adjust the height of the turntable with bearing screw in such a way, that the voltage is 0 V ±100 mV. Seal hereafter the screw with sealing paint.



Checking the angle setting

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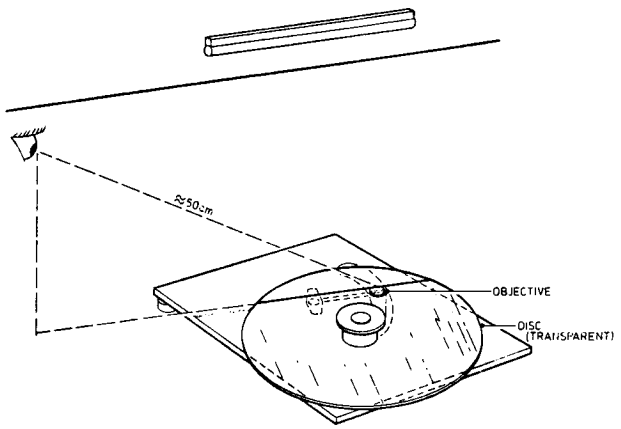
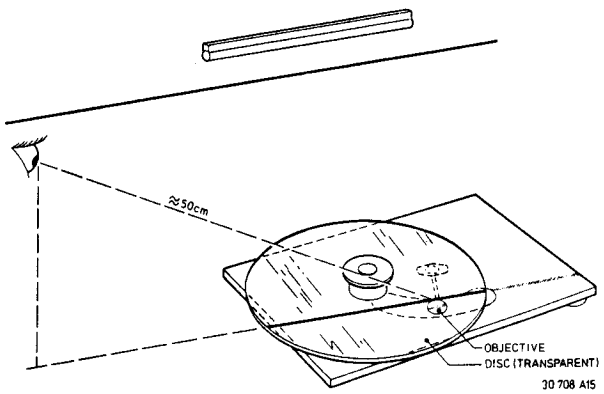


Place mirror 3634029 on the objective and glass disc 3634040 (with disc hold-down 3634032) on the turntable.

Locate the unit under a light source and under this light source a straight line should run (e.g. fluorescent tube with grid).
Set the arm to mid-position. Turn the unit until the arm is parallel to the line under the light source (see fig.).
Look in the direction and in the prolongation of this line to its reflection on glass dics and mirror.
These lines should not be more than 4 mm apart:
Position the set in such a way that one line runs across the centre of the mirror. When the other line remains inside the mirror's surface, the distance is ≤4 mm.



Rotate the CD mechanism through 90° relative to the previous position.
The arm must be kept in mid-position (see fig.).
Repeat the previous measurement.

Adjusting the angle setting

With respect to the adjustment of the angle between disc and light path, the factory has looked for a compromise between minimum angle deviation and minimum arm friction.
In the measurements show that the angle falls outside the tolerance given, the angle should *not* be adjusted for minimum deviation, but just within tolerance. The new setting should lie between the "old" setting and the optimum setting.

After adjustment, the friction of the arm should be checked. This is done by means of a spring-pressure gauge which is connected to the counter-weight. The friction of the arm, measured over the total schanning deflection, is not allowed to exceed 30 mN.
When the friction appears to be too high, the angle should be reset to its old value. Then replace the arm by a new one and check the angle once more.

Adjustment of the angle is performed as follows:
Place the set on the servicing supports 3634027.

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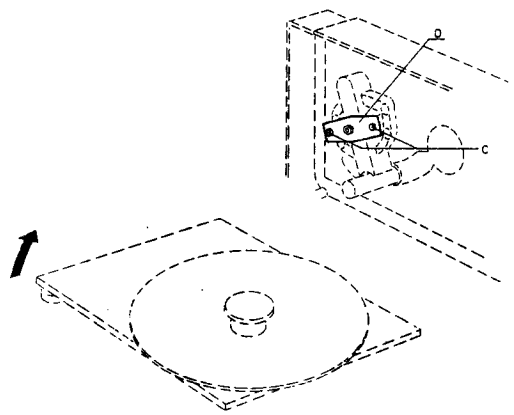
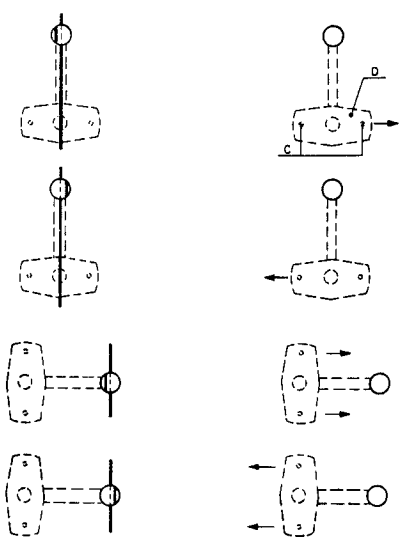


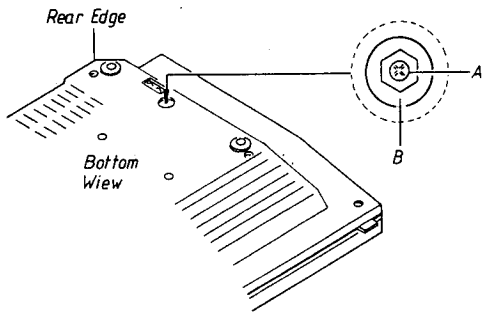
Loosen screws C (see fig.) until bearing plate D can be shifted.
Correct the angle setting by shifting the bearing plate in the direction indicated on the figure.
Tighten screws C ensuring that the setting does not drift. **Double check** the angle setting in two directions.

ATTENTION!
After setting the angle, the height setting of the turntable should be checked.



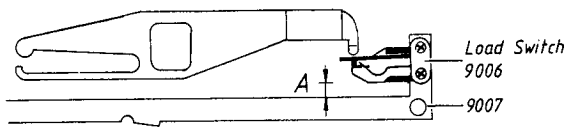
Height adjustment of lid

Before undertaking the height adjustment the set must be *fully* assembled, and the adjustment is made through a hole in the bottom plate of the set.



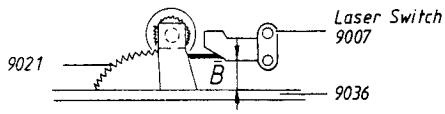
Loosen holding screw A.
Adjust the bushing B, using a 6 mm hexagon spanner, until the lid is flush with the upper edge of the control panel (±0.5 mm).
Tighten the screw A.
In case the adjustment is not within the tolerance range, this may cause failure of function in the eject system.

Load Switch



When fastening the load switch 9006, make sure the distance A between the lower part of the switch and the bracket 9007 is 3.4 mm.

Laser Switch



When fastening the laser switch 9034 make sure the distance B between the lower part of the switch and the bracket 9036 is 6.8 mm.

Spring 9009

When fitting spring 9009 in the bracket 9007, **always** mount the spring in the middle hole.

ELECTRICAL ADJUSTMENT
Laser power supply

Since the light pin is very sensitive to static charges, care should be taken that during measurements and adjustments of the laser power supply the potentials of aids and yourself equal the potential of the CD mechanism.

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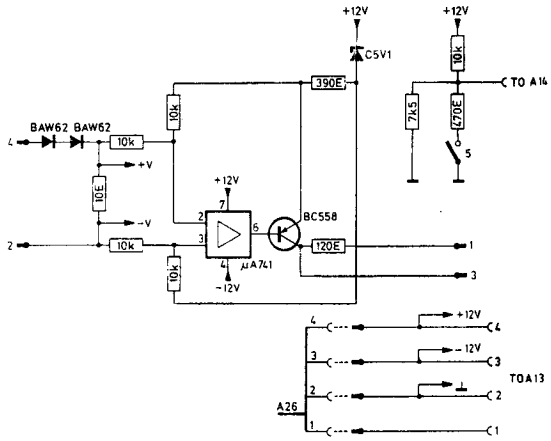


Check

The laser simulator PCB 3634028 should be used here.
Take the flex PCB out of socket A11 and connect the switch simulator PCB with the socket.
Remove plug A13 and insert it in the socket on the simulator PCB.
Connect the plug with 4 wires to socket A13. Take out plug A14 and insert the plug with 1 wire in socket A14.

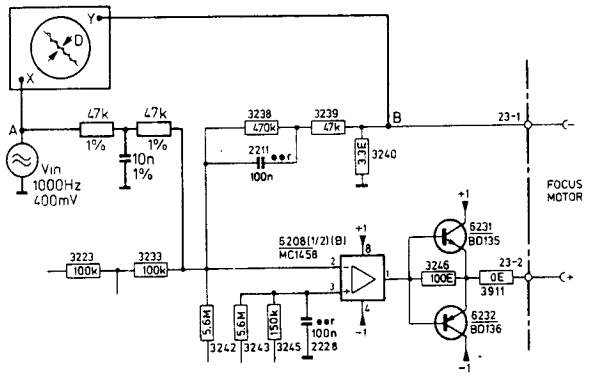
Set the switch on the simulator PCB in the OFF position and the mains switch in the ON position.
Turn trimming resistor 3140 clockwise (max. R) and measure the voltage between points +V ad -V on the simulator PCB.
The voltage should be $\leq$15 mV.

Check of laser supply control:
Set the switch on the simulator PCB in the ON position and measure the voltage between points +V and -V on the simulator PCB.
Resistor 3140 clockwise (max. R):
U +V -V = 225 mV ±45 mV.
Resistor 3140 counterclockwise (min. R):
U +V -V = 750 mV ±150 mV.
Set resistor 3140 in mid-position.
This is a preliminary adjustment. After the simulator PCB has been removed the laser current must be adjusted.

Adjusting the laser supply

Play track 1 of test disc 3634031 (disc without defects).
Connect a DC voltmeter across resistor 3308 on the servo PCB (= on emitter of transistor 6239 and ground).
Adjust the laser power supply with resistor 3140 until the voltage across resistor 3308 is 575 ±75 mV.

Adjusting the focus bandwith



Make a measuring arrangement according to the figure. Play track 1 of test disc 3634031 (disc without defects).
Adjust trimming resistor 3138 on PRE.AMPL. + LASER PCB for a 180° phase difference between signals A and B.
This corresponds with a minimum distance D in the Lissajous pattern.

R = 47 kΩ - 1%
C = 10 nF - 1%

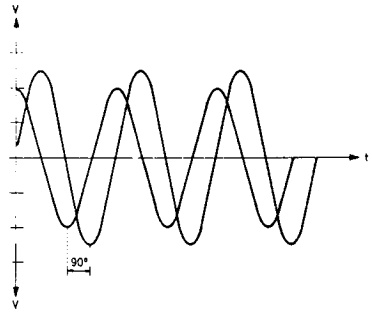
Focus offset

Trimming resistor 3132 should be i mid position.

Motor-control check (Hall)

1. Disconnect the wire from PRE.AMPL. + LASER PCB to connector A18 pin 4 on the Hall motor control.
2. Connect channel A of a dual-beam oscilloscope to the emitter of transistor 6082, 6083 and channel B to the emitter of transistor 6084, 6085.
   Position of oscilloscope: 2 V/div - 10 ms/div.
3. Switch the set on.
4. Apply a *negative* voltage to pin 4 of connector A18.
   The voltage may *not* be applied until *after* the circuit has been connected to power supply voltage. Start from 0 V and slowly proceed to -5V. Now the motor should run.
   When the motor runs the voltage can be brought to approx. -2.5 V.
   The motor should continue to run then.
5. The oscilloscope should display sinusoid signals now (see fig. A).
   After approx. 2 s they should lie symmetrically round the 0-axis and be shifted 90° relative to each other.
   The maximum ratio of the amplitudes of these 2 signals is allowed to be 1:2.
6. The amplitude depends on the applied voltage.
   The V-in/V-out pp ratio should lie between 1:2 and 1:3.
7. Determine at which V-in the motor runs at 600 rpm.
   At 600 rpm the frequency of V-out is 30 Hz.
   At this speed V-in should lie between -1.5V and 3.7V.

Conclusion:
When all these conditions are present motor and PCB may be considered on order.
If points 4, 5 and 6 are not correct, the fault should most probably be found in the electronics.
If points 4, 5 and 6 are correct and the voltage to be applied at point 8 is e.g. -4.5 V to obtain a motor speed of 600 rpm, there will most probably be something wrong mechanically E.g. the bearing friction is too high.



Check of the AGC and offset circuits

(See SERVO PCB).
Play track 1 of test disc 3634031 (Disc without defects).
The voltage between pin 1 of IC6212 and ⊥ should be –4 V ±2 V.
The voltage between pin 14 of IC6215 and ⊥ should be –2.5 V ±2V.

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TECHNICAL SPECIFICATIONS

Frequency range	3-20,000 Hz ±0.3 dB
Signal-to-noise ratio	>96 dB
Dynamic range	>96 dB
Harmonic distortion	0.003% at 0 dB
Channel separation	>94 dB 20-20,000 Hz
Channel difference	<0.5 dB
Converter system	14 bit, oversampling 176.4 kHz
Low pass filter	Digital + analogue
Damping >20,000 Hz	>50 dB
Output	2 V RMS at 0 dB
Power supply	Type no. 5121: 220 V
	Type no. 5122: 240 V
	Type no. 5123: 120 V
	Type no. 5125: 240 V
Power frequency	50-60 Hz
Power consumption	25 watts
Dimensions W x H x D	42 x 7.5 x 31 cm (16½" x 3" x 12 3/16")
Weight	6 kg (13.2 lbs)

Subject to change without notice

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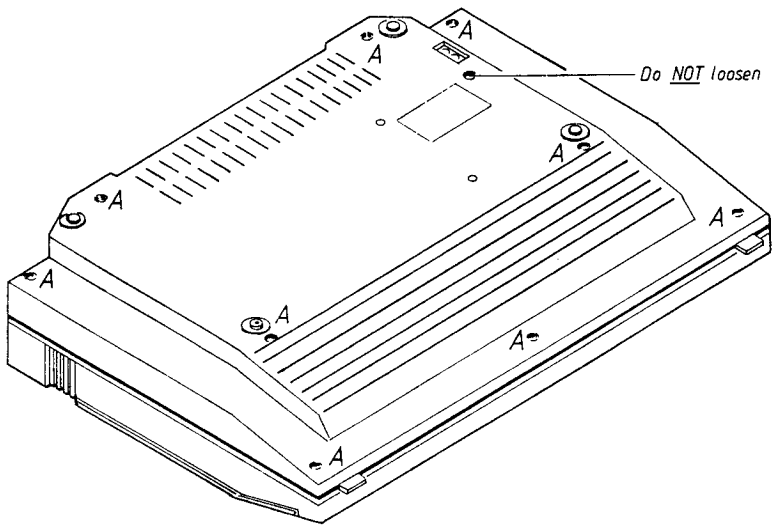
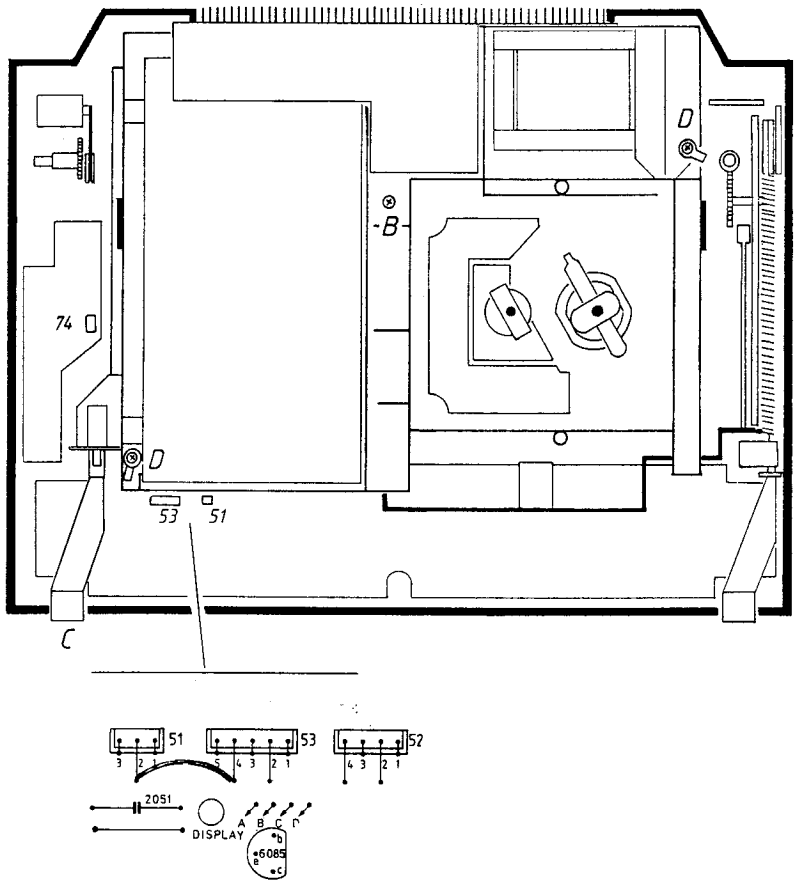
DISMANTLING
Bottom



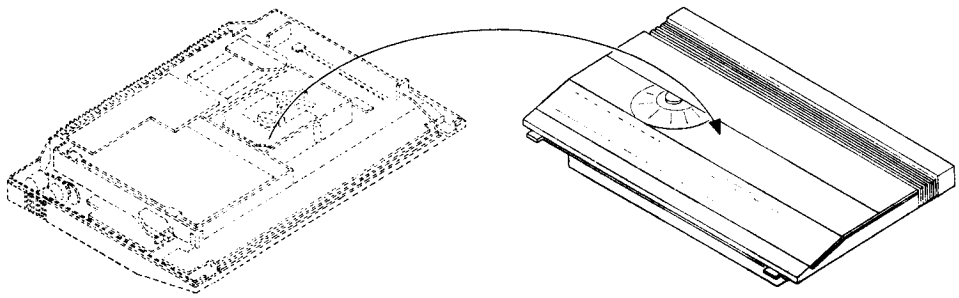
Remove the screws A.

Top plate

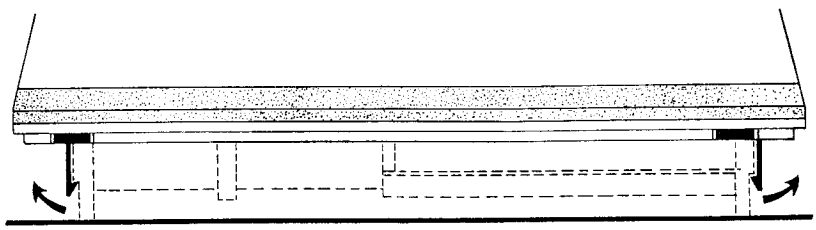


Top Plate
Remove the screw B.
Remove the PLAY button C.
NB! The ON/OFF switch must be in position OFF when removing the button in order to avoid damaging the switch.
Remove the two ground connections D.

Remove plug 74 on the lid motor control PCB.
Then introduce a short-circuit from socket 53 pin 4 to 51 pin 1 ground on the control and display PCB.
NB! When plug 74 is removed and a short-circuit has been introduced between 53 pin 4 and ground, the dust cover functions cannot be operated.



Turn over the set while supporting the chassis frame.



Tip out the two plastic tags.
Carefully lift off the top plate.
NB! Be aware of the cable connection between the top plate and the chassis frame.

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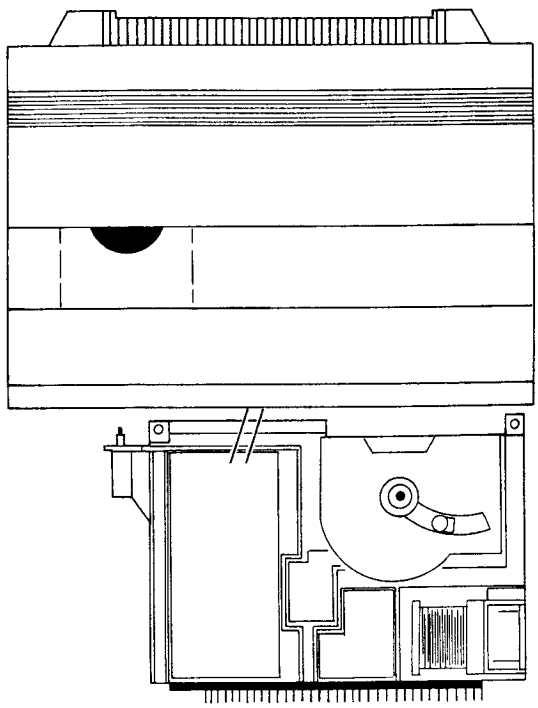
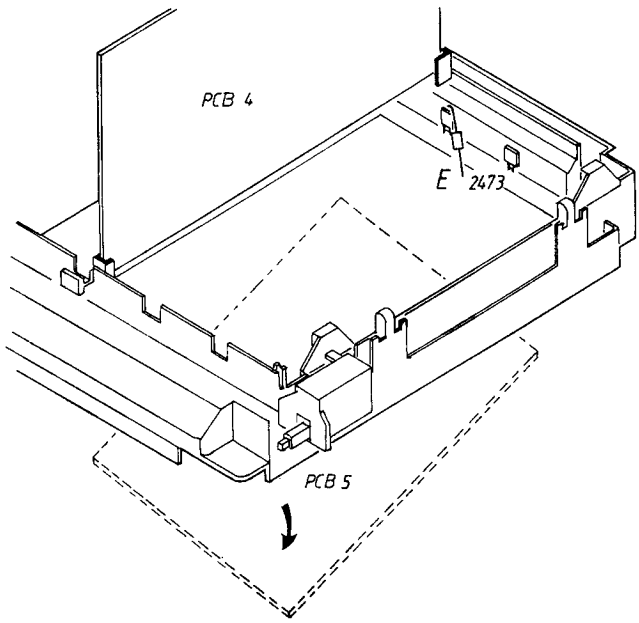


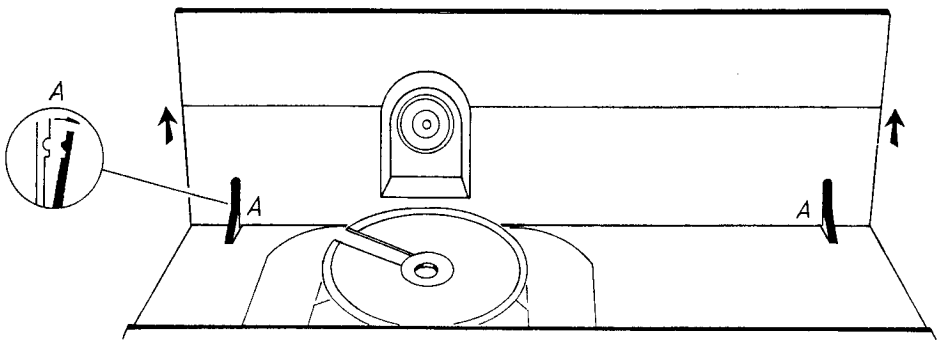
Place the top plate in front of the chassis frame as illustrated.

PCB4 and PCB5.



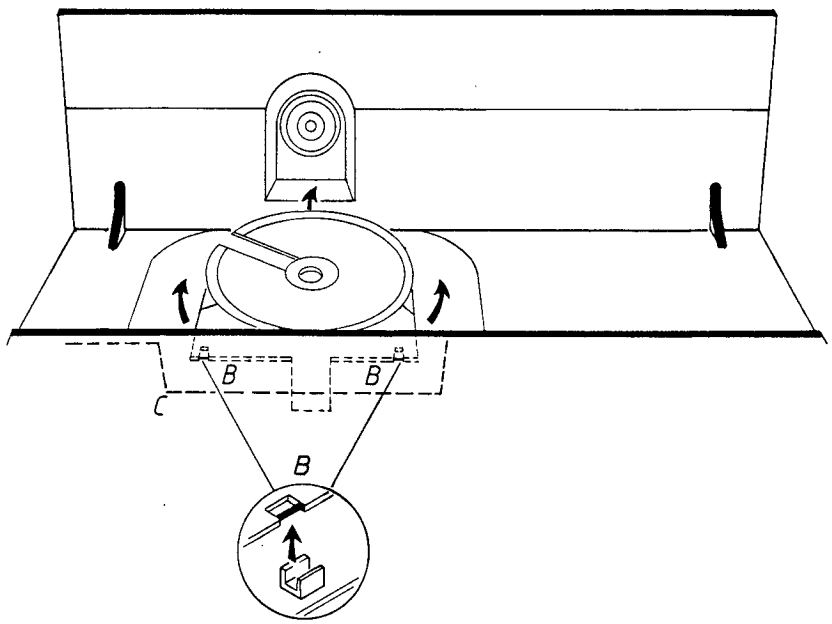
Tip up PCB4 and place in service position.
PCB5 cannot be tipped up until the capacitor E is desoldered.

Replacement of dust cover



Tip out the hinges A in both sides as illustrated.
The dust cover my now be pushed upwards.

Replacement of disc platter



Lift out the disc platter from the two clips B.
Pull the disc platter towards the dust cover. It is thereby disengaged.
NB! When mounting the disc platter, the tounge must be placed under the eject bar.

SERVICE TIPS

In order to prevent loose metal objects from getting in the CD mechanism it will be necessary to see to a clear repain station.
Before the player is being used or service, the transportation screws should be removed.
These screws have to be reapplied after servicing.

Ensure that the player is not resting on the shaft of the turntable motor or the light pin during repairs and measurements.

The player consists of various MOS ICs. Since MOS ICs are generally very sensitive to overload and overvoltage, servicing operations should be performed with the utmost care.

In the player chip components have been applied. For insertion and removal of chip components see page 2-1.

When the top part with the lid mechanism has to be demounted for repair, a loose hold-down should be employed.
Part no. for the disc hold down is 3634032.
For normal function of the set, when the top part is demounted the lid on the top part have to be closed.

Rubber bushing

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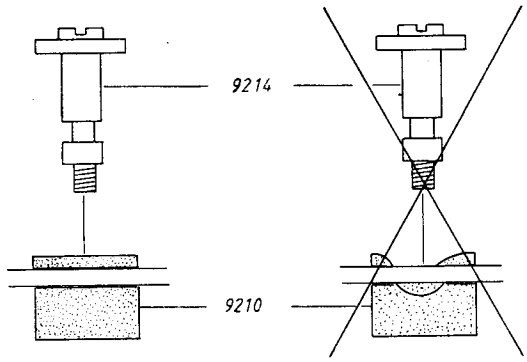


When replacing rubber bushings (pos. 9210) make sure the rubber is not stuck in the hole in the chassis.

Mechanism

Servicing the Radial and Focusing unit pos. 9409.

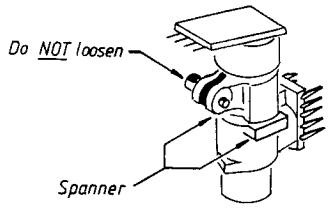
- Take the two flex PCBs out of the connectors on the preamplifier PCB.
- Disassemble the *defective* RAFOC unit by removing the 4 bolts no. 7 and shaft item number 9411.
- Remove shaft item number 9411 of the new RAFOC unit.
  Pay attention to the 3 intermediate washers item number 20 and spring washer item number 21 they should assume the same positions after assembly.

Mount the Radial and Focusing unit.

- Loosen the 4 bolts no. 7 until the bottom plate can be removed.
  Do not remove bolts no. 7 (they hold the new Radial and Focusing unit together).
- Mount the new Radial and Focusing unit on frame 9410.
  Ensure that the 3 intermediate washers 20 and spring washer 21 are positioned correctly before fixing shaft item number no. 7.
- Check that the arm moves freely and the angle setting as well (see check and possible adjustment of angle setting).

Replacing light-pin

– For replacing the light pin it is not necessary to remove the Radial and Focusing unit.



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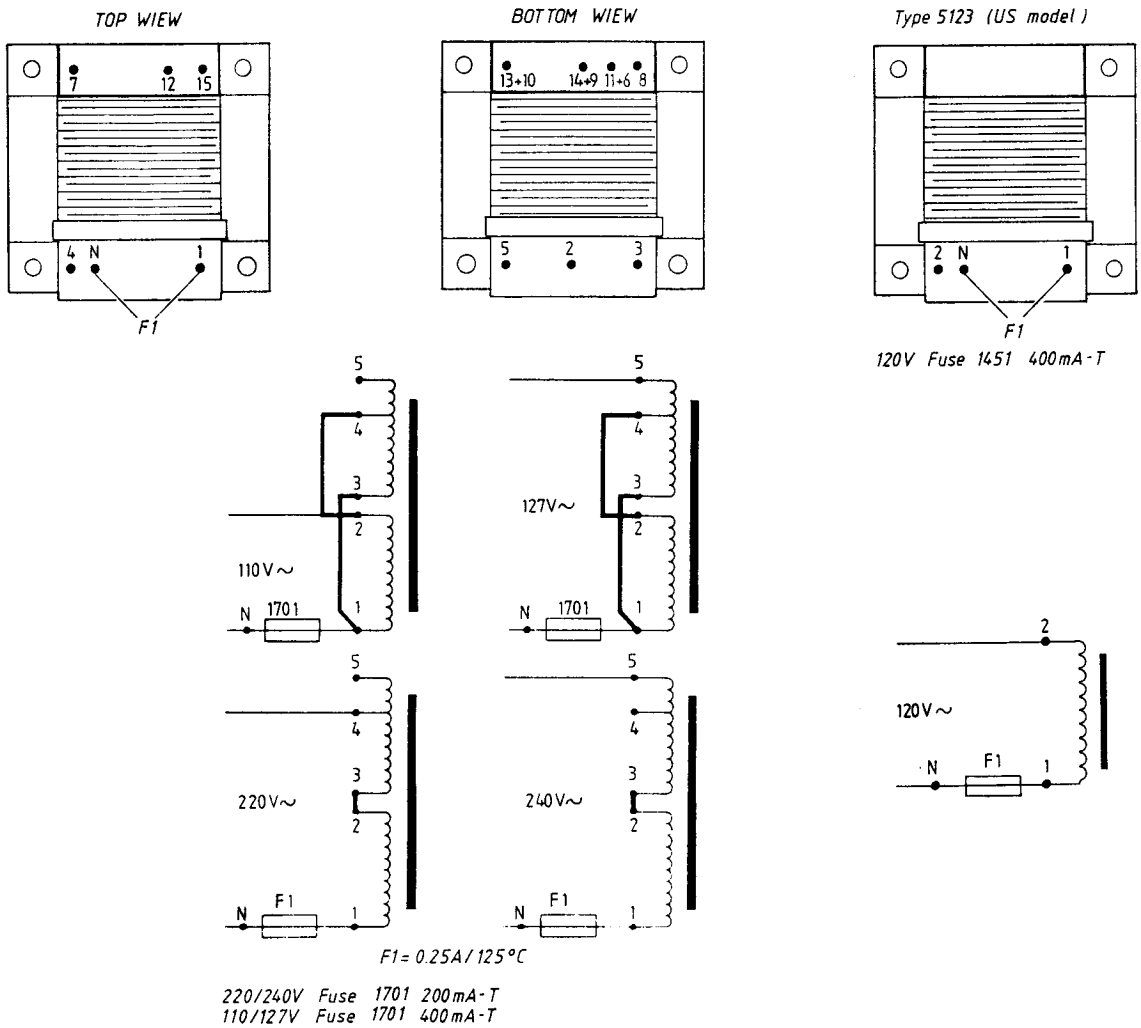
The light pin can be removed by turning it anticlockwise by means of an open-ended spanner of 12 mm and afterwards pulling it out of the arm. During mounting, the light pin must be pushed into the arm as far as possible, and turned clockwise.

The CD-mechanism is provided with self-lubricating beariings and should thus not be lubricated.

Attention:
To prevent adjustments from changing, no screws other then those mentioned above should be loosened.

The light pin is much more sensitive to static charge than a MOS IC. Careless treatment during servicing may reduce life expectancy drastically. For this reason care should be taken that during servicing the potentials of the aids and yourself equal the potential of the mechanism.

Mains Transformer Wiring



INSULATION TEST

Each set **must** be insulation tested after having been dismantled. The test is to be made when the record player has been reassembled completely and is ready for delivery to the customer (with the transis screws tightened).

Make the insulation test as follows:

Short-circuit the two pins of the mains plug and connect one of the terminals of the insulation tester.

Set the mains switch in position ON.

Connect the other terminal of the insulation tester to one of the two screws placed on the heat sink on the back of the unit.

NOTE!
To avoid ruining the set it is essential that both insulation tester terminals are in really good mechanical contact.

Now slowly turn the voltage control of the insulation tester until a voltage of 15.-2 kV is obtained. Hold it there for 1 second, then turn the voltage down again.

At no point during the testing procedure any flashovers are permissible.

TROUBLE SHOOTING GUIDE
CDX

General checkpoints

In the detailed troubleshooting method which follows a number of general conditions, required for proper functioning of the player, will not be repeated.
Before starting the detailed troubleshooting method these general points should be checked.

a: Ensure that disc and objective are clean (remove dust, fingerprints, etc.) and use undamaged discs.

b: Check whether all power supply voltages are presents and have the correct level.

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3538642 03-86 TO PAST INTO SERVICE MANUAL: BEOGRAM CDX 3538625

TROUBLE SHOOTING GUIDE FOR BEOGRAM CDX

no

yes

Before starting trouble shooting, place the CD in service position

Place a compact disc in the player and press play:

1.
Lid closes? → Check all switches - OK? → Repair switches

Check that 6IC6078 pin 24 goes high and pin 25 stays low → Check control and display circuit

Check motor control circuit (PCB8), and lid mechanism

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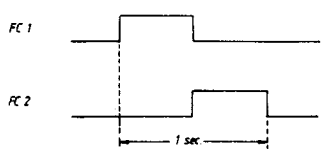
2.
Disc starts turning? → Does laser emit light? → Does 4IC6202 pin 6 supply a low level? → Check functions around 4IC6202, 4IC6201, control and display circuit

Does laser emit sufficient light? (see service man. page. 5-1) → Check laser supply unit. (PCB 02) Check laser.

Is laser angle correct in relation do disc? (see service manual page 4-2).

REMOVE COMPACT-DISC. PRESS PLAY.

Note if laser moves up and down approx. 3 times. Does the laser move? → Does 4IC6202 pins 12 and 13 supply the pulses shown? → Check functions around 4IC6202



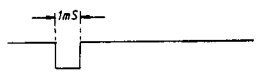
Does voltage on E of 4TR6231/32 vary between approx. ±5V? → Check focus servo output (PCB 04)

↓

Check focus mechanism. Check connection between focus servo output and focus coil.

PLACE COMPACT DISC IN PLAYER AGAIN PRESS PLAY

Does 4IC6205 pin 2 supply the pulse shown? → Does the focus error signal level change? (Plug 24-4 PCB 04) → Check output from 2IC6101 and laser diodes

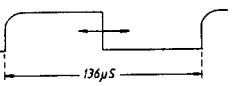
FN 

↓

Check voltages around 4IC6205.

Does FCO 4IC6202 pin 14 go low? → Check functions around 4IC6202 and 4IC6201.

Does 5IC6510 pin 4 supply a pulse with time constant of 136 µS? → Check 5IC6510

MCES 

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Is MCES signal also present in 4R3261? → Check voltage around 4IC6205.

Measure voltage on E of 4TR6233. Voltage must be between -1.5 and -2.5V. → Check motor stop circuit (PCB 07). Check turntable motor amplifier (PCB 04)

Check hall motor (see service manual page 5-2)

CAN ONLY BE MEASURED WHILE COMPACT DISC TURNS

IF DISC STOPS TURNING, ACTIVATE PLAY AGAIN

3.

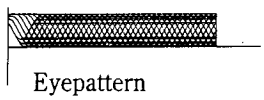
COMPACT DISC STARTS TURNING

(In some cases the disc stops again)
Do green digits light?

→ Can an eyepattern signal (approx. 1 Vpp) be measured in test point 65 (5IC6501 pin 7)?

→ Does laser move towards center of disc when starting up? (lead in area)

→ Check radial servo output (PCB 04).
Check control signals for radial start up, e.g. µDAC, RDIR, and RCO 4IC6211.
If OK



Eyepattern

Check h.f. amplifier

Do HFLS, HFL and $\overline{DO}$ (5IC6508) go high?
If no constant high signal is measured it is probably due to radial servo circuit being defective.

→ Try manually to lead laser to spot on the disc where there is certainly a signal. Hold laser around this spot while simultaneously measuring HFLS (5IC6508 pin 1): Is it now possible to measure pulses on HFLS. If not, check drop-out HF level detector (PCB05).

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Does $\overline{RCO}$ (4IC6211 Pin 9) go high? Must remain constantly high.

→ Check automatic gain control and offset control, as follows:
Measure voltage on pin 14 of 4IC6215, voltage must be –2.7V ±2V.
If this is kept the offset control circuit is declared OK.
If not check offset control.
Measure voltage of pin 1 of 4IC6212 to be -4.3V ±2V.
If this is kept the automatic gain control circuit is declared OK.
If not, check gain control.
If voltages are measured in both circuits beyond the tolerances indicated, faults must be found in circuits with influence on both control circuits, e.g. 650 Hz OSC or servo signal paths loop.

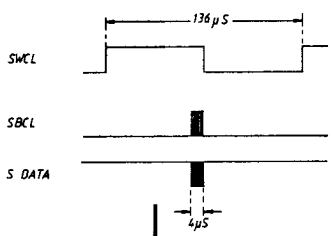
Does P-data (5IC6501 pin 5) go low?

→ Is the PLL circuit locked in? (5IC6501 pin 22 must change from approx. 1.8MHz in stop mode to 4.3 MHz in play mode).

→ Check eye-pattern Check functions around 5IC6501.

Check functions around 5IC6501.

Are Q-data transmitted from 5IC6501 pins 2, 3, 4 to 4IC6201 pins 26, 27, 1?



→ Check functions around 5IC6501, 5IC6504, 4IC6201.

Check functions around display IC (6IC6078)

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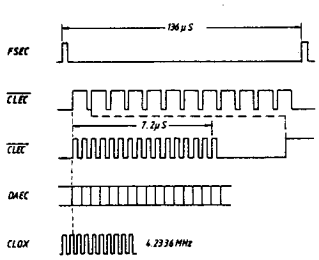
In order to see the signal sequences in an oscilloscope it is necessary to trigger on the signal shown at the top of the oscillogram.

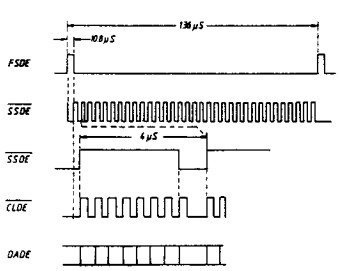
The signals within each oscillogram must synchronize in order to consider the signal communication between the IC's to be OK.

Is signal present on the output of CD player?

→ Is the UNEC flag between 5IC6510 and 5IC6514 low? (Data from ERCO to CIM OK?)

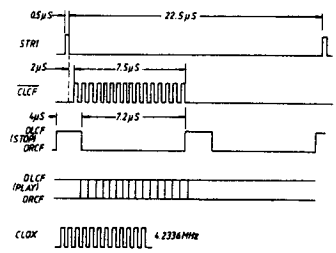


→ Check data transmission between DEMOD and ERCO. Are they OK?

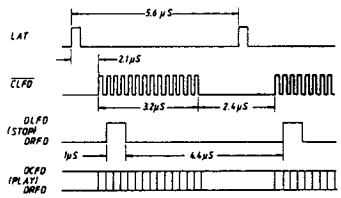


Check data transmission between ERCO/RAM.

Check data transmission betweem CIM and FIL. Are they OK?



Check data transmission between FIL and DAC. Are they OK?



Check functions around analogue output

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